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Journal of Electricity and Western Industry

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydro-electric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

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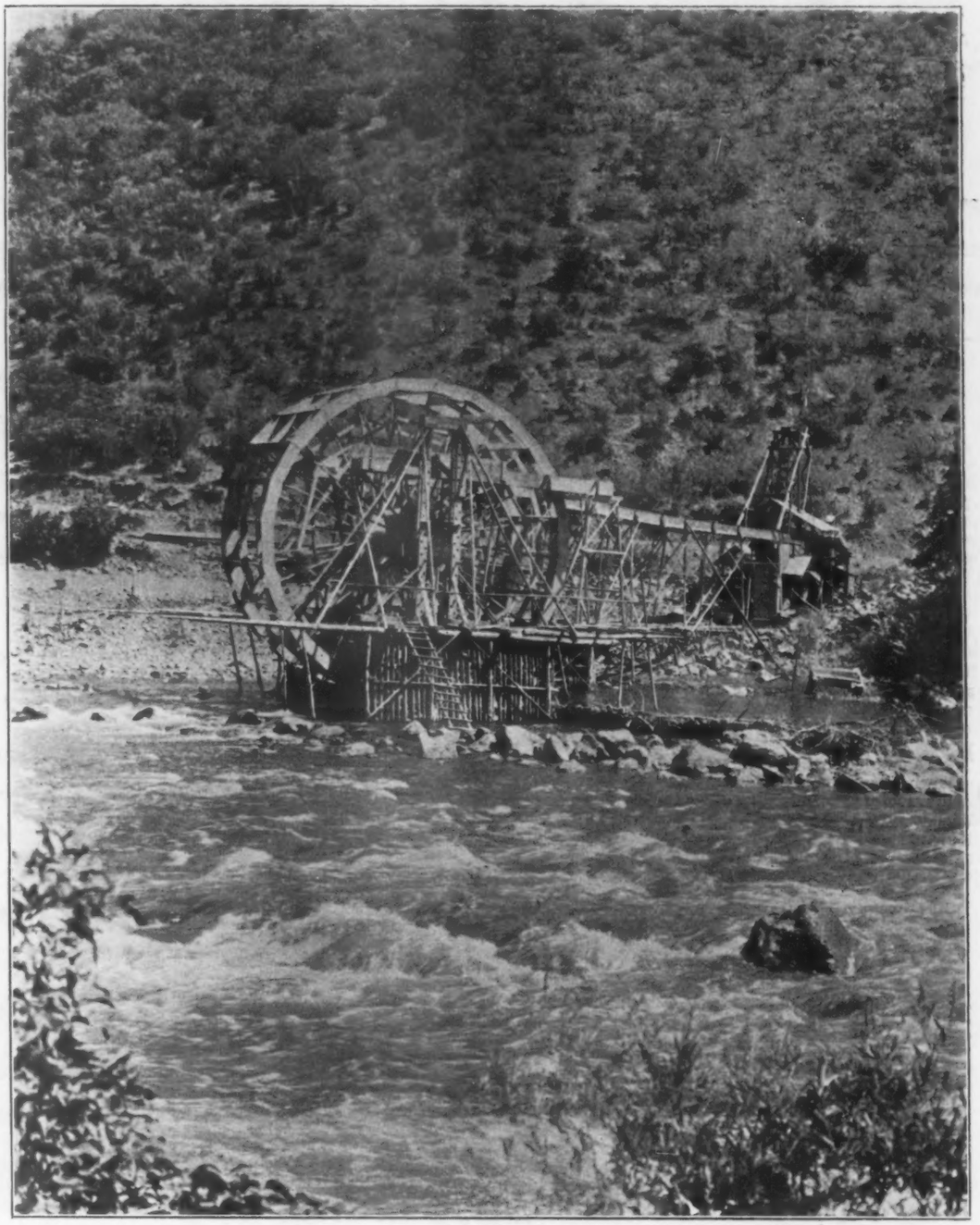

THE FORERUNNER OF THE ELECTRIC PUMP

Dip wheels and impulse wheels, even more cumbersome than the one pictured here, ranging in size from wagon wheels with tin cans fastened to the rim, to great wooden wheels thirty feet in diameter, were used in early days in California for irrigation, pumping and power purposes in mining. Hydroelectric energy, a more efficient method of utilization of the water powers of the West, has supplanted these primitive machines until over 500,000 hp. in electric pumps is now used in irrigation in California alone. The apparatus above is a dip-wheel on the Klamath river, in California. The water raised by this wheel turns a water-wheel which operates a pump in the mine.

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ROBERT SIBLEY, EDITOR

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MORE BUSINESS AND BETTER BUSINESS

The SLOGAN FOR 1922

THE Executive Committee of the National Electric Light Association at its December session in New York City enthusiastically launched a movement that will receive emphatic endorsement throughout the West, namely, that this year's activities from now until the June convention be devoted toward bringing to reality the slogan, "More Business and Better Business."

This does not mean that the important work of the accounting section or the technical section will in any sense be overlooked, but it does mean that a general conviction prevails throughout the nation that immediate emphasis on building the domestic load, both in lighting and appliance uses, can be made to effect national increases in power sales.

At the meeting above referred to, Frank Smith, chairman of the Lamp Committee, outlined effective means as to how the lamp sales can and will be furthered. Wm. H. Atkins, general superintendent of the Boston Edison Company, followed by President Edgar of that company, emphatically stated that central station executives the nation over should be pushing sales, while E. W. Lloyd, of the Commonwealth Edison Company of Chicago, proposed that the slogan for 1922 be, "More Business and Better Business." The resultant discussion brought out the fact that companies such as the Philadelphia Electric Company, according to a statement by Vice-President Johnson, by pushing household appliances, increased the load of their domestic consumers fifty per cent during the past season. President Bump thereupon announced that he would urge by personal message to all member company executives throughout the United States that the principal business of the present administration be devoted to increasing business, particularly in the domestic field, the central station taking its part in formulating public opinion and in stimulating appliance sales through the regular channels of distribution.

This policy put into practice throughout the nation with particular emphasis in the West means much for the coming season. With distribution lines already serving a vast territory of fruitful possibilities, it is no exaggeration to state that it is within the range of possibility to double the central station load in this region within the next two years. This can never be done, however, without the active dynamic pressure of central station executives behind the move. The opportunity is a great one and the other three branches of the industry stand ready to do their share in the West. Will the active backing of central station executives be forthcoming?

The Passing of Cheap Power

A NEW world wonder in engineering achievement is about to make its initial bow in the putting in of the Chippewa development of the Hydro Electric Power Commission of Ontario, Canada, at Niagara Falls. The undertaking sprang from comparatively modest proportions, namely, a ditch that would cut out from Lake Ontario above the Niagara Falls and by-pass the water not only below the falls but on down beyond the rapids, thus taking advantake of a complete drop of some three hundred feet. An original development of one hundred thousand horsepower was contemplated at a cost of ten million dollars. Today, however, the people of Ontario, Canada, are facing the development of five hundred thousand horsepower involving a total outlay of money for the project mounting upwards to some eighty millions of dollars, and in order to acquire sufficient water rights to fill the canal with 18,000 sec.-ft. of water required for this vast power, it is now deemed necessary to purchase the Toronto Power Company's plant of 125,000 horsepower at a cost of thirty million dollars additional and thus again add greatly to the original unit cost of developed power.

The West congratulates the East on the near accomplishment of a new and interesting feat in engineering achievement in this wonderful Chippewa development, but it is interesting to note in passing that California and the West will continue to lead not only the eastern United States in the cheapest unit cost of power to the consumer, but now due to the vast increased cost of power at Niagara Falls, the West with its private developments bids fair to surpass even that district, which was long looked upon as favored.

Safeguarding the Future of Private Business

THE Weinstock Lecture at the University of California this year was given by Wigginton E. Creed, president of the Pacific Gas & Electric Company, who chose as his subject the safeguarding of the future of private business.

In his address Mr. Creed brought out most forcefully the modern tendency in business ethics wherein the old saying of "Let the Buyer Beware" is being replaced by the modern slogan of "Truthful Advertising," laying especial emphasis on the fact that modern business is thoroughly convinced of the truism that honesty is the best policy.

The question then arises as to how private business with its ever-increasing idealism is to be safeguarded. The answer is to be found in due attention to the development of personnel or morale within the organization. That organization which within itself holds honest policies as the best policies and wins its employes completely to itself by its evident sense of fair treatment both to the public and to its employes is founded on a rock that cannot be shaken.

There is a tendency on the part of government more and more to regulate and interfere with private life and business. After all the only way to meet this danger is for business itself—great as has been its evolution toward higher ideals—to give even more in order to justify its existence. Business ought to be the leader and not the led, and since true leadership is founded upon high spiritual ideals rather than bull strength, the public at large has a right to expect a leadership of intelligence from business that is placed upon such a high plane of ethics as to be impregnable against any assault. By such a course alone can the future of private business be properly safeguarded.

Three Interesting New Scientific Advances

IT is difficult to record all the new advances that are constantly being made in scientific and industrial development in America. A recent inspection of eastern enterprises brings to light three interesting and important advances. The installation of an electric light in the outer harbor of New York City of 1.2 billions candle power, which though designed for maritime use, presents the possibility of thrusting a beam upward into the heavens so that inhabitants on Mars, if there be such, could recognize New York Harbor as a star of the sixth magnitude, is at once interesting and fascinating. The exhibit at the Bureau of Standards of a new advance in the manufacture of optical glass of such clarity that one may readily read a typewritten page through a section of this glass fifteen inches thick portends new advances in optical evolution in the near future. And again, the development of the Ultra Micrometer at the Bureau of Standards capable of measuring so delicately that the one billionth part of an inch may be ascertained is an astonishing new scientific achievement. The principle upon which the instrument works is based upon the law of two parallel circuits exactly in tune which upon any slight variation in one of the circuits throws the two out of tune and produces harmonics that can be measured with such delicacy that the billionth of an inch is under control in observation. Of course, such delicacy as this is so subject to extraneous forces that it presents a great problem in securing the necessary isolation to bring to use such minute observations.

These typical instances serve to show, however, that America is not backward in the development of new and interesting advances that are each day, even though the thrilling urge of war time necessity has long since passed, placing her scientific research well in advance of the nations of the world.

The Crushing Urge of Commercialism

EVERYWHERE one goes there seems to be an overpowering urge to pull the workers away from specialization back into general commercial pursuits. From Paderewski, the world famous pianist who has recently announced his intention of forsaking the professional career for the raising of almonds in California, to the professional man who has gone into business fields,—go where you will, the general urge will be found the same. Consult the highly specialized experts of the Bureau of Standards or the purely technically employed engineer, and you will find that on the surface, the reason seems that all have become body worn and somewhat brain fagged over specialization. The deeper inquiry into the reason, however, largely brings forth the answer that specialization does not hold the reward which the effort involved should command. Certain it is, however, that the large majority of specialists in engineering practice are justified in their complaint that the man who wields the executive control or who runs the end of the business where the money is made, receives far more consideration than the specialist whose brains make possible the enterprise upon which the money is made.

It is all a sad commentary on our modern age of commercial ego and the selfish appraisement of value that is given by those who have the directing of industrial and engineering activities. But the sadder aspect of the case is that unless the situation is remedied, another generation may find industry and engineering woefully lacking in specialists.

Possibilities of Color Harmony in Home Lighting

WE are hearing much of new effects achieved in the art of stage lighting. Without any change in physical property, it is possible to simulate a change by variation in color values produced by concealed sources of electric light as reflected by especially prepared wall and ceiling surfaces.

It has remained for some venturesome illumination pioneer to follow this same thought in the interior lighting arrangements for the home. As a matter of fact, the experiment in the home has been

going on for some years. Without any expense for changes in draperies, walls or shades, a wide variation in pleasing effects is produced by providing four-circuit fixtures of the semi-indirect type equipped with blue, green, amber and white globes.

Economy, novelty, and utility seem to lend forceful argument to a fair trial for this innovation in adapting electricity to the needs and enjoyment of the modern home.

Flood Control Dams to Stop Waste

WITHIN the last few months we have had attention directed to flood conditions in nearly every section of this great West. In some instances by superhuman efforts in protection measures, the damage due to overflow was reduced to a minimum. The same conditions are sure to recur unless means are developed to make such conditions impossible.

Along with this solution of the flood problem it is well to have in mind the conservation of these waters for the future use of industry and commonwealth. If underground supply is not an unlimited source, and in many instances this is apparent, any diversion of surface water by check dams or other similar expedients will prolong the usefulness of artesian or pumped supply systems. Storage dams should intercept the run-off of storm water at such elevation that gravity will carry this water to the place of future usefulness. Damsites are more easily obtainable before agricultural development takes place. The conservation of flood water purely as a source of future supply is now recognized as a problem of the near future in some sections of the West.

Completing 1100 Miles of Transmission

ANNOUNCEMENT from the California Oregon Power Company of the construction of a 110,000-volt transmission line from Glendale to Eugene, Oregon, closes a 115-mile gap which existed between the transmission systems of the Northwest and the great interconnected group of California companies. A continuous transmission system now stretches from Sherman County, Oregon, to the Mexican border—a superpower zone of far greater extent than any ever considered elsewhere in the world. It is not proposed, of course, to transmit power direct from one end to the other of this distance, but complete interconnections between companies make it possible to shift blocks of power from one division to another, so that sectional droughts or shortages from other causes may be ironed out for the entire coast. There remain only two short gaps in southern and eastern Washington to complete the 1800 miles of transmission from Montana to the coast and thence to Southern California. The California interconnections have long ranged among the pioneering achievements of this section; the present construction greatly enlarges not only the magnitude of the accomplishment, but the area which is to be benefited, extending these safeguards and advantages to the great fertile area of the Northwest.

Effect of Disarmament Upon Industry

THERE has been much speculation as to what effect upon industry the ten-year holiday in naval construction may have. In round numbers, the holiday proposed will probably effect a saving of, say, one hundred million dollars annually. About fifty per cent, or fifty million dollars annually, is the labor charge-off; the other margin is practically concerned with the steel industry. The best experts agree that this will only affect industry as a whole to the extent of about 3/10 of 1%, certainly not greater than one per cent as a most liberal allowance. In any case the naval holiday under the international agreement proposed is to be welcomed, but it is at the same time gratifying to note in passing that there is little paralysis in industry as a whole to be anticipated from putting into practice the ten-year holiday program in naval construction.

Regarding the Licensing of Engineers

WE are thoroughly in accord with the present policy of the Federated American Engineering Societies wherein the enactment of laws for the licensing of engineers is not advocated, but in those commonwealths where local engineers desire it or where conditions are so forced upon the engineering profession that the situation must be met we believe that everything should be done to see that such laws are passed as will best maintain the dignity of the profession and yet at the same time leave the engineer's relations with his client unhampered.

The Federated American Engineering Societies have worked out a model licensing law and we strongly urge upon all engineers interested to secure a copy of this draft.

Combining Public and Private Enterprise

SERIOUS thought might well be given to the possibility of utilizing the combined strength of public and private enterprise in the West. That part of great irrigation storage control or power supply development work which may truly be chargeable to investment capital might perhaps be financed by government guarantee, whereas all that capital necessary for operating might well be completely under private control. Such a division of the financial responsibility would lessen the interest rate involved and at the same time would seem to have sufficient merit to warrant deeper consideration.

Surely there is some way whereby the lowest rate of interest obtainable can be utilized for developing western resources without sacrificing the advantages of private initiative. The constantly increasing favor with which utility securities are being sought in those states where commission regulation is most advanced, is a striking indication that the day is not far distant in which public service securities will approach parity with the lowest interest bearing securities on the market.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Electrical Exports Show Distinct Gain

U. S. Department of Commerce Figures for 1913 and 1921 Record Large Increase in Value; Predict Better Business in 1922

ELECTRICAL exports for the United States for the year 1921, as compared with 1913, very positively contradict the pessimistic ideas of the export trade so far as the electrical industry is concerned, according to figures prepared by the Department of Commerce. Compared with 1913, which is taken as a fair pre-war year, the increase in value of exports is far beyond the influence that is exerted by rise in prices. Quantities also indicate a decided increase.

The figures given below indicate the gain that has been made, the data for 1921 involving a preliminary estimate for the month of December based on the average for the preceding five months.

Article	1913	1921
Dynamos and generators	$2,374,122	$8,022,000
Fans	415,774	1,271,000
Lamps:		
Arc	134,053	14,000
Incandescent—		
Carbon filament	254,893	127,000
Metal filament	301,791	3,104,000
Motors	4,886,508	15,222,000
Telegraph apparatus (incl. wireless)	147,233	995,000
Telephones	1,659,326	4,732,000
All other	18,923,663	62,478,000
Electric locomotives	250,843	2,388,000
Totals,	$28,448,206	$98,353,000

While it is difficult to judge what 1922 may have in store for the electrical industry, all indications point toward a better condition for its export trade. The world is making use of electricity as never before, and American manufacturers are readily able to take a fair share of the over-sea business offering.

U. S. Court Ruling on Refusal to Sell

Beech-Nut Company Decision Re-opens Question of Right of Manufacturer to Refuse to Sell to Price-Cutting Dealers

CONFUSION only has resulted from the decision of the United States Supreme Court, handed down recently, reversing the decision of the Circuit Court of Appeals, and holding that the Federal Trade Commission was within its rights in ordering the Beech-Nut Packing Company to cease and desist from certain trade practices which had for their purpose the control of resale prices on its product. Despite the fact that there has been a unanimity of opinion that the decision resulted in absolute defeat for the packing company, Mr. Charles W. Dunn, counsel for the company, sums up the situation in the following words:

"The entire Court sustains the right of the Beech-Nut Packing Company to decline to sell its products to dealers who do not observe the fair resale prices suggested by it, holding that such refusals to sell, per se, effected by a private manufacturer in pursuance of his own independent discretion, and without any purpose to create or maintain a monopoly, are not violative of Section 5 of the Federal Trade Commission Act. The Court directs that the order of the Federal Trade Commission be modified whereby the prohibition of such refusal-to-sell conduct, per se, set forth therein, is wholly stricken out. The principal issue involved in this case, from the beginning, was whether the Commission had the power, under the Act creating it, to forbid the Beech-Nut Packing Company or any other manufacturer from refusing to sell its goods to dealers who fail to observe suggested prices, where such refusal is made in pursuance of the manufacturer's independent discretion, without any purpose to create or maintain a monopoly. The entire Court upholds this right of refusal and denies the power of the Commission to limit it. The four dissenting members of the Court hold that the order of the Commission should have been wholly set aside and not modified even to the extent indicated in the light of the record in issue. The main point to observe, however, is the affirmance of the refusal-to-sell policy, per se, under the Federal Trade Commission Act, just as it was affirmed in the Colgate case under the Sherman Act."

It is now universally conceded that the situation can only be remedied through the passage of legislation along the lines of the proposed Stephens-Kelly Bill. In no other way can the right of a manufacturer to control the resale price of his product be re-established and all related questions be lifted out of the mire of legal precedent created by this and other decisions.

Seattle Hits Snag in Utility Control

Deficit in Interest and Redemption Fund for Street Railway Bonds Causes City Officials to Adopt Drastic Measures

FORCED by the necessity of having on hand funds with which to meet principal and interest amounting to $1,237,750 due March 1, 1922, on the $15,000,000 in bonds issued in payment for the city traction lines, officials of the city of Seattle have placed the semi-monthly street railway department payroll on a warrant basis. Railway employes receive in place of the usual pay checks, warrants stamped "Not paid for want of funds." These warrants, which bear six per cent interest payable from the street railway fund, must be presented to banks for payment, either with or without discount, as the banking officials see fit.

Disbursements for supplies and miscellaneous expenses have been on a warrant basis for several weeks and it was found that only by placing the

payroll on a similar status could funds be acquired to meet the city's obligations on the bonds. Every penny of the daily receipts of the car lines, which average approximately $17,500 per diem, would be needed to make up the deficit of $274,449 which existed in the interest and redemption fund on January 10. The contract of purchase of the lines calls for the payment of interest and redemption thirty days before due.

As soon as the deficit is made up, receipts will again be turned into the street railway fund and the warrants called in as rapidly as the condition of the fund will warrant.

Electric Railways in Serious Position

Expert Tells California Real Estate Association That Practically Every Privately Owned Road Is Technically Bankrupt

PRACTICALLY every electric railway in the United States is technically bankrupt, according to a statement made by Guy W. Wolf, manager of the research department of the California Real Estate Association, at the annual convention of that body in Oakland, California, recently. Mr. Wolf in speaking on the subject of "Electric Railway Transportation in Relation to the Enhancement of Realty Values" voiced the opinion that, with few exceptions, the securities of such utilities were below par, their earnings not equal to their fixed charges and their borrowing power greatly reduced if not negligible.

Mr. Wolf said in part:

"This unhappy condition of the roads is due to a combination of circumstances. Automobile competition in most cities, the jitney, robs the companies of the cream of the trade without any opportunity for recouping the loss in other directions.

"The shortsighted policy of local authorities in limiting fares, in placing hampering charter restrictions upon operations and extensions, and in requiring outlays which do not properly belong in the category of the railroad company operating costs, have combined to drive most companies into bankruptcy.

"The consequence has been that no single privately owned electric railroad in the state of California is now or has been for several years making any extensions. The high cost of new money, the hampering local restrictions and the unfair competition of other transportation agencies makes it unwise for the companies to attempt necessary extensions. The cities of California are multiplying their population by from 25 to 50 per cent every ten years, but there are not now in prospect any material additions to the electric transportation facilities in these cities."

This is a matter which, as Mr. Wolf says, demands the attention of all fair-minded citizens, as well as the real estate man, whose prosperity depends indirectly upon the transportation facilities to the property which he is trying to sell.

Court Decides Against L. A. Bond Sale

Los Angeles Saves Approximately $2,000,000 as a Result of Decision that Power Bonds Must Be Re-sold

THE sale, without public advertisement, of $13,500,000 electric power bonds to the I. H. Hellman interests at a discount of $1,535,000 by the Los Angeles City Council has been declared illegal and invalid by the Supreme Court of California.

The bonds were voted early in 1921 for the purpose of purchasing the distributing lines of the Southern California Edison Company inside the city of Los Angeles and at the same time making other hydroelectric improvements. At the time of the issue the bond market was such that the bonds could not be disposed of at par with the five per cent interest set by law. At the recommendation of the Public Service Commission the entire issue was authorized to be sold to I. H. Hellman at a discount which would tend to increase the interest to approximately six per cent.

Immediately following the announcement of the sale, injunction suits against the council were filed in the Los Angeles county courts. The action of the council was upheld and the sale held legal. The case was appealed and the decision of the Supreme Court apparently settles the matter. Mayor Cryer has refused to affix his signature to the bonds since the legal proceedings against the council were instigated so that the sale has never been carried through.

Presuming the sale of the bonds at or above par, with the improved bond market, some $2,000,000 is thus thrust upon Los Angeles under the present decision.

Oregon Body Scores Tax-free Securities

State Chamber of Commerce Goes on Record as Approving Legislation Which Would Equalize Burden of Taxation

UNANIMOUS approval of a resolution asking that legislation be passed by Congress equalizing the burden of taxation, the major portion of which falls upon private enterprises whose securities are not tax exempt, was the feature of a recent meeting of the Oregon State Chamber of Commerce. The resolution follows:

Whereas, our present policy of Federal taxation has undergone a most radical change from that of indirect to direct taxation, and

Whereas, such change has resulted in chief reliance being had upon a graduated scale of taxation upon income that levies high rates upon those of large income, and

Whereas, by reason of such rates there is a constantly increasing volume of capital being invested in and diverted into non-taxable securities of the federal, state and minor subdivisions of government and instrumentalities of government, and

Whereas, the investment and diversion of such capital has proved a serious handicap to productive enterprise and has given to such exempted securities an unfair competitive advantage in the markets for capital, and

Whereas, such investment on the part of those of large income serves to exempt them from the payment of taxes they otherwise would be obliged to pay, and

Whereas, there is thereby necessarily imposed upon those who cannot benefit by such exemption an unfair burden of taxation;

Now, Therefore, Be It Resolved by the Oregon Chamber of Commerce in third annual convention assembled, that it recommends that necessary corrective legislation be provided to remove the present inequitable burden of taxation and to make all income from whatever source and in whatever form bear its just proportion of the cost of government and remove the discrimination now prevailing between securities of government and those of private enterpsise.

Such move on the part of the Oregon State Chamber of Commerce is indicative of the feeling of many other organizations in the West. Any legislation which would facilitate the development of the hydroelectric and other resources of this western empire, as such legislation would by turning money to investments in public utility securities, is highly welcome at this time.

Letters to the Editor

American Valuation Association Presents Views on Proposed Plan

To the Editor:

Sir: We wish to impress on the trade journals of the country the importance of supporting actively as well as tacitly the American Valuation Section of the tariff measure now pending in the Senate.

In the past the tariff has been a party issue, and with an administration and Congress of the same political faith it would be ordinarily fairly easy to forecast the approximate character of forthcoming tariff legislation. For the first time in history there is a sharp division in the leading parties on the tariff issue. Due to conditions growing out of the war, the pending tariff legislation is an issue on which party lines are almost entirely ignored, thus introducing an element of uncertainty at a time when normally the result would be a foregone conclusion.

The time has come when every silent conviction favoring the protection of American industry and national prosperity should be given expression in words so clear and unmistakable that the concert of patriotic public opinion will drown for all time the clamor of un-American propaganda that has lately been loosed upon the country, menacing our manufactories with industrial paralysis and millions of our citizens with a European brand of poverty.

This menace is not imagined. It is real. The real voice of America must speak out so unequivocally that no Senator in Washington can be in doubt as to the tone and quality of sober American thought on this insistent and far-reaching issue. We must not allow paid propaganda to pass for American public sentiment.

It has been stated that the importers and large mail order houses have spent in the last few months over one-half a million of dollars in propaganda against the adoption of the American Valuation Plan. The majority of manufacturers of this country are in favor of its adoption. The National Association of Manufacturers, composed of 6000 members representing perhaps the largest group of manufacturers in the United States, recently held a referendum on this subject and over 75 per cent of the replies favored its adoption. The Southern Tariff Association has come out strongly in favor of the American Valuation Plan, and wherever there have been meetings of local associations held to pass on this subject the majority of the membership has endorsed it.

We believe that if you sound out your advertising clientele, who in nearly all cases are manufacturers in this country, you will find them almost unanimous in favor of its adoption because conditions with them today are not a theory but a fact.

The argument that the adoption of the American Valuation Plan would destroy our foreign trade does not take into account that only 12.06 per cent of the goods imported into the United States is affected by ad valorem duties, that 61.08 per cent comes in free, and that 26.52 per cent is admitted under a specific duty. These figures are taken from a report prepared by the United States Tariff Commission. It is thus seen that 87.94 per cent of the imports would not be affected, regardless of what is done with the 12.06 per cent that come under ad valorem rates. This 12.06 per cent, however, does have a vital bearing on the industries of this country because of the fact that they represent the larger bulk of goods that have undergone complete manufacture in the country of export, and in consequence have a more direct bearing on the manufacturing industries of this country.

These data have been called to your attention because, in our estimation, they have not received the prominence that might well be given to them in quashing arguments put forth by importers tending to give the impression that the adoption of American Valuation would result in a general upheaval in the administration of the tariff. While it is relatively a small part of the tariff administration, it is an exceedingly important part in that it vitally concerns the basic sources of American prosperity.

H. L. HENRY, Vice-President.
American Valuation Association

Obvious Objections to American Valuation Plan Cited by Importer

To the Editor:

Sir: Regarding the American Valuation Plan proposed for the new tariff, there appear to be several obvious objections while whatever advantages it may have appear less clearly. American importers seem almost solidly to oppose the change. The present system of determining value for customs purposes at the place and date of export has been in effect for over a hundred years, and importers hold that during that period very effective machinery has been developed by the United States Customs service.

The proposed scheme would have the value determined by the wholesale price in the principal markets of the United States of comparable or competitive merchandise manufactured here, or, if there were no such goods produced in this country, by the value of the imported articles. It is true that many importers in voicing their objections to the suggested change overlook the fact that such valuation is to be established as of the date of export from the country of origin. They argue that if duty is to be levied upon the basis of the price in this country, they will not take the risk of fluctuation, but will be compelled to sell in bond, rather than with duty paid as at present. This would be true if the valuation were to be set upon arrival of the merchandise in this country, but the plan does not contemplate such a measure, but provides that valuation shall be reckoned as of the date of exportation. Therefore, the importer will be in a position to know the amount of duty he must pay as soon as he receives advice of shipment, and, accordingly, he will be enabled to sell his goods duty paid while they are afloat, just as he does now. Therefore the impression which many importers hold, that they must remain in ignorance of the duty cost during the period between shipment and arrival, is unfounded. Of course, when they buy goods for future shipments, they will have to take the risk of fluctuating value, which is true of the present system as well.

The matter of establishing the value in this country, however, appears to present a real difficulty. As it stands the measure proposes that the wholesale prices in the principal markets of the United States shall govern. But what are those markets, and when a different wholesale price exists in each, which price is to govern? Japan has a growing salmon-canning industry. It is not impossible that at some future date Japanese salmon may find its way into this country and be subject to a duty. Pacific Coast salmon has a different value in Seattle, San Francisco, New York, and Chicago, all of which cities might be classed as among our principal markets, and it would appear to be an arbitrary choice to base the valuation of the Japanese product upon any one of those prices.

Owing to the great size of our country there are many divergencies in the values of goods in the various sections. This would necessarily be the case, even if the freight alone governed the situation. But there are other factors as well. It frequently happens that stocks of certain goods move to particular markets within the country in excess of the immediate demands of those markets, and the values of such accumulated goods temporarily decline. There appears to be no reason why this local value should have a necessary influence upon the amount of duty which must be paid upon similar merchandise brought into another section of the country.

Another objection is urged, which would apply even if the technical problem of determining domestic value were solved. It happens that articles appear on the list of dutiable imports which are in the same classification, but of which one may have a value when it arrives here of which the freight charge forms a small percentage, whereas the value of another may be made up to a considerable extent of the cost of transportation. The American valuation system would increase the duty upon the latter article to such an extent as to prohibit its importation.

Supporters of the measure urge that its adoption would equalize the duty on goods from countries with a low and a high cost of production respectively, and likewise on goods from countries with a low and a high cost of production respectively, and likewise on goods from countries with a stable currency and countries whose monetary unit is greatly depreciated. This would amount virtually to protecting foreign countries against one another, which should not be any particular concern of ours.

It may be that the investigation of the American Finance Committee will develop good reasons for adoption of the plan, but in its present state it does not appear wise to substitute it for a system which has been most thoroughly worked out.

HILMER J. OEHLMANN.

H. M. Newhall and Company, San Francisco.

An Appreciation of "The Dollars and Cents Standard of Industrial Success."

To the Editor:

Sir: One cannot read Mr. Leurey's "Second Contribution" in your January first issue, without several touches of the old-fashioned "Amen." How vital it is in modern industrial efficiency to avoid the "frozen investment." Capital wasted, misused in improperly planned and badly executed extensions, is lost. Such wasted capital has no second chance to benefit humanity. Its efficiency, its value has been ruined; its creation has reverted quickly to death and its life added little to man's service.

I speak as if capital were animated and we do in a measure make it animated when we cause it to serve us wisely. A famous painter once said that he mixed his colors with brains and, just so, if we invest our capital with brains, we reap a just reward while the industrial world as a whole receives the benefit from the general advancement.

The equation of industry is not always a simple expression. The specialists can often grasp the ultimate economic values, supply the basic plan and spend capital more wisely than those in immediate command. The man, active in our western industrial field, who knows that B.t.u.'s and dollars cannot always be equated, has a vision beyond apparent facts or hasty conclusions. An electric B.t.u. has a wonderful future ahead in our Pacific Coast territory.

ALFRED H. POTBURY, Engineer.

Coast Equipment Company, San Francisco.

Radio Bulletins

The Journal of Electricity and Western Industry is sending out each week by radio-telephone a report on the outstanding engineering and industrial developments in the eleven western states, together with a concise review of business conditions in the principal cities in this district. The following excerpts are representative items taken from messages sent out.

The Greater California League has been organized to combat the proposed state amendment which authorizes the formation of a board to supervise the development of all water and power resources in that state. The state would be bonded to the extent of five hundred million dollars to pay for these developments.

The Portland Railway Light and Power Company is preparing plans for an 80,000 horsepower hydroelectric project on the Clackamas River near Mt. Hood. The road into this section of Oregon is already under construction and work on the actual project will commence as soon as supplies and material can be transported into the mountains.

The harbor at Coos Bay, the ocean outlet for a large portion of the lumber of Oregon, will be improved during the coming year when the government will spend in excess of three million dollars to make the harbor navigable for large ocean-going steamers.

The gold and silver output for California during 1921 was in excess of nineteen million dollars according to the U. S. Geological survey reports.

Portland is the only port on the Pacific Coast to show an increase in the value of its exports for 1921 over those of 1920. The increase was approximately ten per cent, the total value of the exports being sixty-seven million dollars.

The Fitzsimmons Hospital in Denver, a government institution for the rehabilitation of world war victims, has recently installed one of the most powerful radio phone sets in the intermountain district. The station is used for the instruction of veterans as well as the broadcasting of government messages and radio concerts.

Three million feet of timber near Aberdeen, Washington has been placed on the market by the government. The final day for the receipt of bids on the tract has been set as March 30. The timber is valued at $2.50 per thousand board feet.

Secretary Hoover will hold the first hearing of the Colorado River Commission in Washington on January 26. The meeting will discuss the development of the Colorado with a view of immediately formulating plans for flood control irrigation and the production of power.

The following reports are of business conditions in the principal Western cities:

Los Angeles: Forty-seven new industries were established here during December. Building permits for January will exceed six million dollars. The customary first-of-the-year slump apparently has not affected business.

Portland: Orders for lumber are being received faster than the mills can handle them and there is a possibility of a shortage of logs. Railroads are again active in the lumber market. Shipping active while wholesale sales are picking up.

Seattle: Twenty-nine steamships are scheduled to sail from this port for the Orient during this month. Reports on the grain and fruit crops for the past year show increased production and large profits. Sales, both retail and wholesale, are below normal.

Salt Lake City: War Finance Corporation loans have assured a successful pear for the sheep, cattle and sugar beet raisers, and have eased the situation in this section. Collections are only fair while sales are inactive.

Denver: There are indications that wages in the building trades will be reduced shortly. The mines are slowly approaching normal, although the effects of the recent coal mine strike has not worn off. Unemployment is increasing owing to seasonal inactivity.

San Francisco: The city is in the midst of a building boom following more than a year of inactivity. Office buildings, dwellings and apartment houses are under construction while architects report plans for many more are being prepared. A completely equipped electrically operated restaurant was recently opened.

Builders of the West

THERE is, perhaps, no figure in the public utility field who possesses to such a high degree the manifold and exacting qualifications of an executive of a corporation devoted to the task of serving the public, than does Wigginton E. Creed, president of the Pacific Gas & Electric Company. It can also be said that no man is more clearly conscious of the fundamental role which the utilization of hydroelectric resources of California will play in the economic, social, industrial and financial development of the West.

WIGGINTON E. CREED

President of the Pacific Gas and Electric Company and other industrial enterprises, who is an active figure in promoting the progress and development of California through the utilization of hydroelectricity.

Mr. Creed has been president of the Pacific Gas & Electric Company since July, 1920, but prior to that had been a prominent figure in the public utility arena. He had already distinguished himself by his views on public policy, utility regulation and the relationship and importance of building up an understanding between an organization and its consumers and security holders, through his previous position as president of the East Bay Water Company. It is the consistent policy of the Pacific Gas & Electric Company to fit the man to the job, the evident motto being "Don't buy anything if you have it in stock." The result has been the development of a loyal and efficient "Pacific Service" which is second to none in its field. It is his belief that the foundation of the success of a public utility is the rendering of service, and that the greatest safeguard is a wide distribution of securities among consumers. In this, the company has had remarkable success.

Mr. Creed was born in Visalia, California, and was educated in the public schools of Oakland and in the University of California. He possesses an intimate knowledge of the particular conditions that relate to California and to the West, its people, their needs, wants, aims and ambitions. He was an active participant in all forms of student activities while in college and was particularly successful in journalism, being editor of the collegiate daily paper. After graduation in 1897, he taught school in Fresno, California, that he might continue his study of law at Columbia, his aim being to follow in the footsteps of his father, a noted California attorney. Upon the completion of his law course he started practice in San Francisco and his success was such that when litigation which promised to require an interminable amount of labor and legal acumen seemed imminent, concerning municipal rates on water furnished the city of Oakland by the Contra Costa Water Company, Mr. Creed was selected to conduct the siege. So marked was his success in winning his battle and mastering the intricacies of the public utility game, that he was induced to undertake the presidency of the company which later became the East Bay Water Company. His management of the affairs of that company in its reorganization and financial rehabilitation stamped him at once as an executive of unusual ability.

Mr. Creed is a follower of the "strenuous life," is an outdoor enthusiast, being particularly addicted to all forms of hunting and fishing. He is particularly fond of hunting mountain lions. and prefers horseback riding to golf. It is also reported that he is fond of regaling intimate friends with savory examples of his culinary skill, specializing particularly on wild game.

In addition to his public service work, he has had marked success in the management of the large affairs of the Columbia Steel Company, and also the manifold duties appertaining to the C. A. Hooper Lumber Company and its subordinate interests, serving as president of both of these large industrials. On his character, reliability and fitness for service he was chosen president of the Alumni Association of the University of California and as such served on the Board of Regents of that University for several years.

To W. E. Creed, then, for the exercise of indomitable ambition and unflagging energy in the promotion of a better public understanding of the duties and requirements of a public utility, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

The Business Outlook in the West for the Coming Year

Some Outstanding Features in the Present Business Situation Which Will Be of Interest to Business Men of the West in Formulating Their Plans for the Coming Year

By ROBERT SIBLEY
Editor, Journal of Electricity and Western Industry

STUDY of previous business depressions indicates that the Pacific Coast experiences a business depression or a season of prosperity from one to two years after the inception of such a disturbance in the eastern industrial districts of the nation. The typical path of a business disturbance is a radiation outward from the eastern states, gradually spreading to the Pacific Coast. This tendency has been apparent in the present reaction, although the West as a whole has not felt the effects of deflation as keenly as other sections. The Northwest has felt the depression very keenly and is now apparently reviving due to improvement in lumbering, but the southern portion of the Pacific Coast has been affected to a lesser extent. This is due in a measure, no doubt, to the absence of a post-war inflation experienced by many eastern centers, and consequently the reaction has been more moderate. Some authorities assert that in these sections of the West the depression has been merely postponed and that a decline is inevitable.

There are, however, certain outstanding reasons why the Pacific Coast will not feel this slowing up during the coming year, particularly if due attention is given to business-getting ideals and practices that are now being formulated, not only in this section of the country but in the nation at large. While it is true that our progress may be forecast by the application of indexes indicative of the prevailing business conditions, it is also true that there is an enormous field of progress independent of such influences.

The electrical industry particularly, due to its far-reaching ramifications, should take the lead in searching for new channels of business and in actively putting into operation effective sales methods to attain these results.

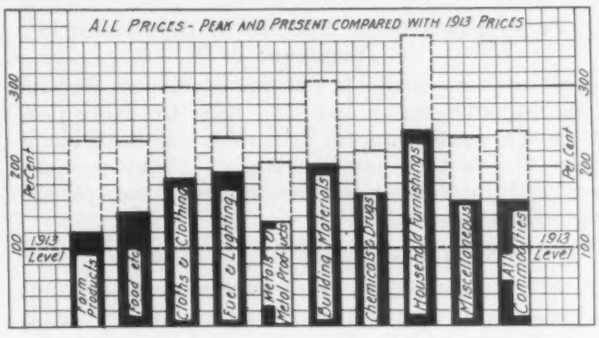
Outstanding Features of the Present Business Situation

Let us then proceed to analyze, first, some of the outstanding features of the present business situation, and then call attention to other influences that are at work to better the situation. During the yearly period prior to the past six months our country experienced the most precipitous price drop in its history, which averaged nearly 50% and caused the writing-off of some $20,000,000,000 of the assets of the nation. Under this violent falling in prices farm products received a reduction too drastic, while the costs of coal, freight rates and general construction are still far above the pre-war average. There are, however, gigantic economic forces at work today which are bound to equalize this unbalanced situation. A fortunate result of all this readjustment, however, has been reduced inventories in factories and warehouses and on retailers' shelves. In addition cost accounting methods of manufacturers are in a high state of development that will go a long way toward bettering the economic problems before the nation.

On the other hand, the problem of distribution, particularly in the electrical industry is far from satisfactory. It is safe to say, however, that the violent reductions in wholesale prices that have been under way prior to the six months' period just closed have brought prices as a whole sufficiently low to assure no more of the unprecedented fluctuations in the months immediately ahead, as were experienced in the critical period prior to the six months' period behind us.

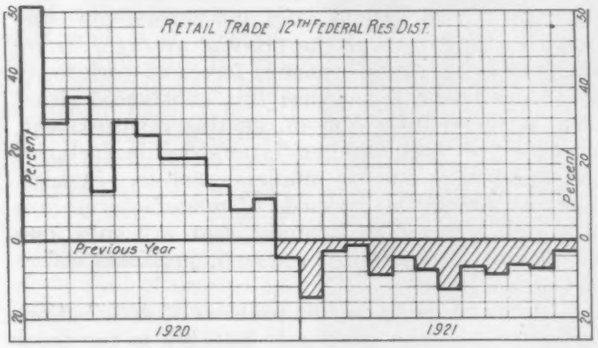
The International Situation

Looking afield, the international business situation seems to be more stable, due to other causes of international interest that have been violently at work since the termination of the war and seem now to be reaching somewhat of a fair solution. The general realization that German reparations, war reimbursements, unbalanced budgets, and inflated currencies must all be adjusted is the conviction of business men throughout the world. The world, outside of Europe, has been engaged most actively during recent months in liquidating the post-war boom



Note in this comparative sketch of all prices—peak and present compared with 1913 prices—how the violent fluctuations of recent months have left a decidedly unbalanced price level among various commodities. Building materials, for instance, are seen to be far above normal, while the high level of house furnishings make the completed home still an almost impossibility for the average householder to attain. The great downward trend of prices of all commodities is now greatly abated but the inter-relationship of prices of one commodity as compared with another still has great room for improvement.

and shows definite signs of recuperation. The surplus in goods is rapidly being absorbed and one of the hopeful features of the situation so far as America is concerned is the fact that competition of European manufacturers in these markets is proving not nearly so disastrous as most economists had thought might be the case. This is clearly shown by a study of the comparative trade reports of the countries of the world in which it will be found that American trade has held up remarkably well. Summing the international situation up as a whole, it would seem that



A chart showing the condition of retail trade in seven western states as reported by the Federal Reserve Bank of San Francisco. The interesting thing about this chart is that retail sales began to fall off in percentage the early part of 1920 and continued through the early months of 1921. During the last six months' period, however, there has been a gradual recovery in retail sales and it is believed that this general betterment will continue during 1922 so that by December, 1922, an increase in sales of, say, 15% over the present year will be reported.

Americans generally should feel a deep source of gratitude in the fact that our people are the best fed among the nations of the world, and that 85% of the working population are busily engaged in the activities of agriculture, commerce and industry and that they are meeting with a fair share of prosperity, for this is evidenced in the savings banks of the country which are showing increased deposits from month to month. While our foreign trade has taken a tumble, this tumble has been no worse than other countries have experienced and we are still in quantity of shipments in excess of that of 1913. Considering then that we have passed through the greatest crisis in history, we have substantial hopes of steady improvement for 1922.

Preparations Being Made by Manufacturing Concerns

While some of the larger manufacturers are still curtailing advertising and sales help, the more progressive are preparing for even more emphasis along these lines in the year immediately ahead, particularly with reference to the newspapers, trade papers and popular magazines.

What Lines Should Be Emphasized

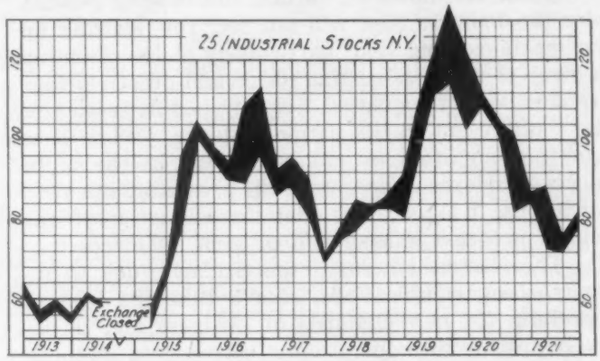
From a general study of the business situation in the eastern section of our country, in the Pacific Coast district and the Oriental and Japanese trade, it is apparent that the eastern section of our country might well devote emphasis to **supplies** and **general lines** rather than upon **apparatus.** Upon the Pacific Coast, on the other hand, the unabated activity in the hydroelectric development means that there should be equal emphasis on all three groups, while in the Japanese and Oriental trade, attention to fundamentals such as hydroelectric construction, cement plants and the like will bring the greatest returns. Economists generally agree that December next should see business better by about 15%.

How New Extensions and New Construction Prospects Are Affected

The liquidation of business and smaller capital required for business operation today is resulting in the piling up of capital available in banks. This as a consequence has released funds for investment. The investment demand is not, however, largely for new construction and extensions, but rather for refinancing old projects. Until new projects and new extensions are undertaken, business generally cannot go forward and money still is scarce for these purposes. It is generally recognized that costs of labor and material are still believed to be unduly high and until these two factors can be better reconciled to the common level of business costs, the full resumption of new enterprises and new extensions can not be hoped for.

How More and Better Business May Be Brought About

There are indications of betterments in the business world, and the thoughts of the people must continually be turned to the constructive vision of how more and better business is to be obtained, if we are truly to usher in more prosperous conditions. A nation-wide drive is now on among all branches of the electrical industry to bring about this condition. Central station business the country over, exceeds that of this time a year ago on the average of 3% to 5%. While in general, the power sales have fallen off to a distressing extent, the peaks have increased. There is but one answer to this. Electrical appliances are producing a very important part of the demands



A chart showing the maximum and minimum quarterly fluctuations of 25 prominent industrial stocks listed on the New York exchange from 1913 through 1920. Note the violent fluctuations that have taken place in the industrial world during this war-torn period. It is to be noted that the stock market has recovered from the terrible upheaval at the end of 1919 and is today on a gradual upraise toward betterment.

of our central stations. This demand has come about because of the necessity for labor-saving appliances in the home. The tendency toward better conditions of living together with the better merchandising of electrical goods, advertising, real cooperation of interests of the producers, bankers, manufacturers,

electrical contractors and the press have greatly stimulated this recent increased use of electricity. So it is realized that one of the great factors in bettering business directly in the year 1922 must be accomplished by more intensive sales methods in which the needs of men and women in the home are studied and met.

As a consequence of all this, the major program of the National Electric Light Association this year is to be devoted to bringing into fruition the slogan "More and Better Business." Public utilities can today secure money at much less rates than in recent years and, too, more money is available.

After careful study of the different activities for new business that should be emphasized during the coming year, the following seem to be most desirable:

(1) Lighting — home, commercial, industrial, street and sign.

(2) Appliances — household, commercial.

(3) Industrial — heating, isolated plants, city, pumping, ice, refrigeration, and electric vehicles.

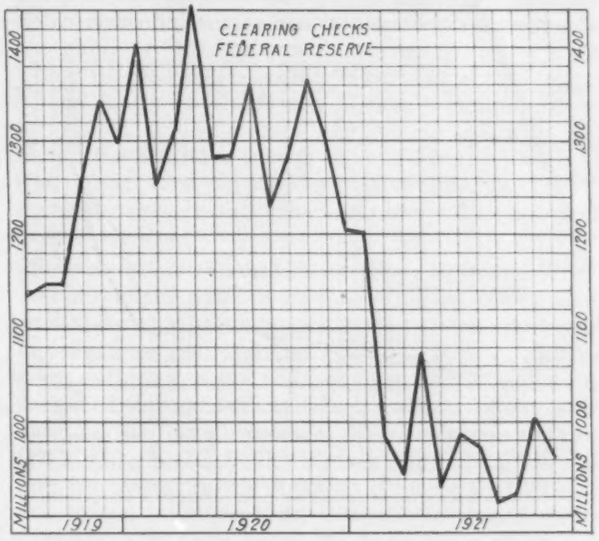
Some Specific Suggestions for New Business

Insofar as household and commercial lighting are concerned, people are staying at home now more than they have in the last few years and therefore use more light. In addition, the servant problem has made it possible to increase the use of electricity through the larger use of electric appliances. Since this situation has increased during the recent months there should be a larger sale of electric appliances. Indeed, tremendous national effort will unquestionably be made this year to introduce electricity into the home on a basis never before approached.

So far as commercial lighting is concerned, it can be pushed and much business secured. Factory business can also be pushed, as in many instances, where factories are running at all, improper illumination is the rule rather than the exception.

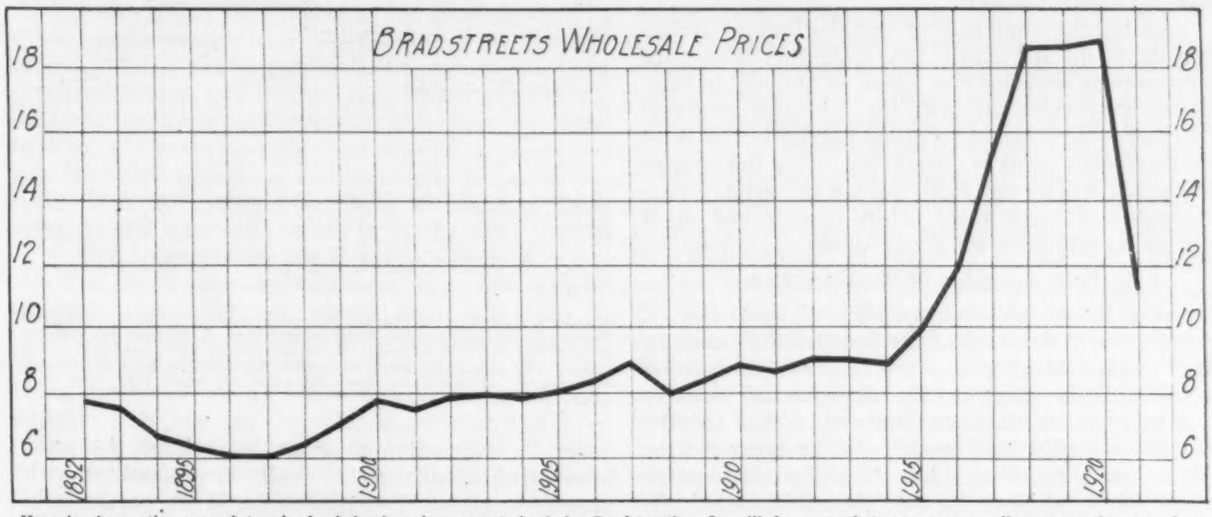
The development of industrial heating should be a good field, very material progress having been made during the war in the use of electric furnaces and other similar devices. The use of these devices can be stimulated by central station activities.

Where city pumping is not being done by the local central station company, this line can be taken up, as has already been done to a large extent in Chicago, where the greater proportion of the water pumped into the city is done by power furnished by the central station company.



While checks cleared through the Federal Reserve Banks do not present an unimpeachable indication of the trend of conditions, still it is interesting to note that these clearings have fallen off during the last year and a half something like 25%, which in a way indicates the general trend in price reductions and total sales in business during this period. Note that cash sales are indicated and not volume sales under this method. It is doubtful if the actual volume sales have suffered anything like the reduction of business that such a chart as this would seem to indicate.

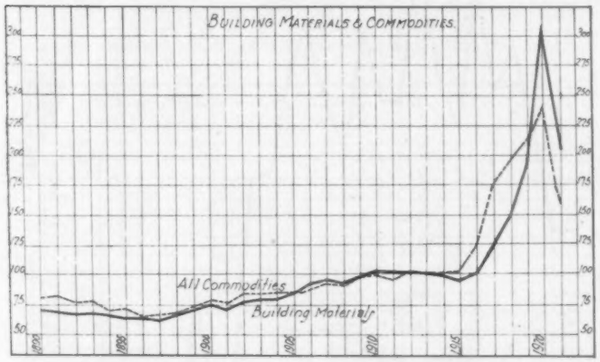
Refrigeration and ice making is another field where considerable progress has been made in some localities. Where ice is made by nature in the winter months, many people seem to think that the cutting of this ice, and its transportation, is cheaper than making it artificially. In any locality where the price per ton is lower for artificial ice than for that



Here is shown the general trend of wholesale prices as set forth by Bradstreet's. It will be seen that an average line connecting up these commodities from 1895 to date will show that the present wholesale price level is almost back to what would have been a normal increase were the war period not taken into consideration. Hence we may reasonably expect that 1922 will see no more violent reductions such as were so common during the earlier part of 1921.

frozen and transported in the winter months, artificial ice-making should be pushed, particularly this field exists in a broad area of the West where great shipments of fruit require ample refrigeration.

The stimulation of the use of electric vehicles for freight transportation and for industrial purposes, in warehouses, and also in some localities for passenger service, is a branch of the industry which



Here is set forth how the prices of building materials have varied with respect to the general prices of all commodities from 1890 down through 1921. Note that the end of 1920 saw building materials skyrocketing in price, while at the end of 1921 a violent reduction of some 50% had taken place. Yet even such a reduction has not been sufficient to bring building materials down to the level of all commodities.

has been sadly neglected, and emphasis laid on this activity by the central stations will bring good results.

There are many other instances of how new business can be gotten by studying the intensive methods that are under way in such districts as Denver where the cooperation of the banks has been effected in establishing the fact that electric appliances in the home are a great economy rather than a luxurious novelty, and where, although Denver is not an industrial city, the power salesmen are having no difficulty in holding existing power business and a recent contract has been closed for the supplying of power to a large ice manufacturer, and next summer will see Denver supplied for the first time with ice made by electric power.

Again, the emphasis of installations of irrigation plants up and down the Columbia River, the Northwest is showing new levels of activity in business of this sort. In fact, the intensive study of practically every central station district in the West reveals evident signs of a coming activity that means sales effort will be put forth during the coming year to a degree perhaps never before experienced, or at least not experienced for a half-dozen years past.

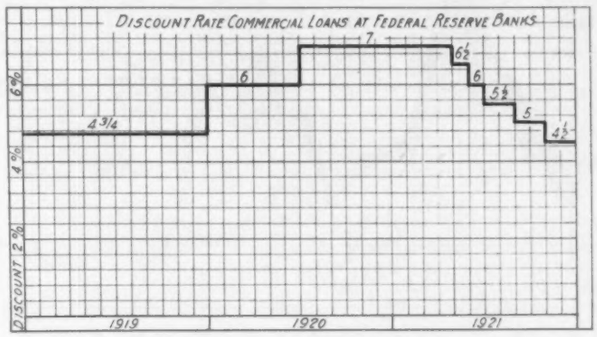
Markets Available in Western States

As great as was the prophecy of hydroelectric development in the issue of the Journal of Electricity and Western Industry for June 15, 1921, concerning the billion dollar program for the next ten years in the West, the construction work of recent months has even exceeded this figure. At the present time actual count shows that there are under construction for the 1922 schedule in the West 666,000 hp. in hydroelectric plants and some 60,000 hp. in steam power plants. There are also hydroelectric power plants to the extent of 1,333,000 hp. whose major contracts are now being let. On the basis of $400 per hp. total necessary expenditure for hydroelectric work and $350 for steam electric work, it is seen that the program launched a year ago is proceeding at an even more promising rate than was anticipated.

What this means in dollars and cents to every citizen of the West may be gleaned from the following tabulation:

100,000 hp. installed in hydroelectric power plants
means
60,000 customers served;
means
the employment of 1,300 people in the electrical industry with salaries paid to them of $2,000,000 annually;
means
the use of 9,000 miles of wire,
and the investment of $37,500,000 in generating plants, transmission and distribution equipment;
means
the furnishing of electricity:
for
the electrification of 25,000 new homes,
thus serving 100,000 persons;
and for
the operation of 240 miles of electric railways,
representing $27,600,000 of investment,
employing 1,200 persons,
carrying 45,000,000 passengers,
and spending $1,375,000 annually as operating expenses;
and for
the operation of mines and reduction plants,
producing $18,000,000 of minerals annually,
employing 4,000 miners;
and for
the operation of 1,300 factories,
representing $100,000,000 of investment,
employing 27,000 persons,
and producing $140,000,000 worth of goods annually;
and for
the irrigation of 125,000 acres of land,
resulting in the expenditure of $6,250,000 for improvements,
producing $9,500,000 worth of crops,
and employing 5,000 farmers and laborers.

In highway construction there have been let major contracts to the extent of $100,000,000, and contracts for street improvement work to the extent of $100,000,000 for 1922. The home building and



A chart representing the discount rate on commercial loans at the Federal Reserve Banks for the past three years. It is to be observed that the present discount rate of 4½% is lower than at any time during this period. This means that money is considerably easier to get and financing will proceed forward under more favorable conditions than have been experienced for some years.

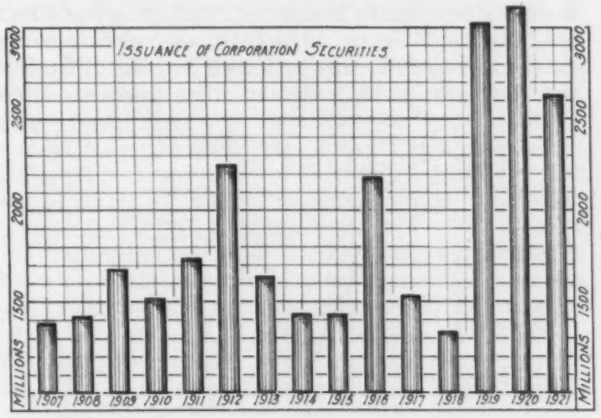
general construction program is perhaps the most interesting of all in that this is proceeding with unusual emphasis throughout the West, particularly in the southwestern portion of the Pacific Coast. Estimates from the Federal Reserve Bank show that

this program is now totaling some $400,000,000 per annum. Indeed, building permits of this extent have been let for immediate construction. In rough figures this may be divided as follows:

40% for commercial and general type of office buildings,
40% for residences, and
20% for industrial construction.

From this outlay of money that is immediately available for home building and business construction it is observable that markets in new home building are open during 1922 that have never existed before.

If now the program of emphasis on buildings already completed and electrically wired, be put through as outlined by the National Electric Light



Here is a graphic representation setting forth the issuance of corporation securities in the United States from 1907 through 1921. It is interesting to learn that the last three years have far exceeded any former years in the history of America in the issuance of corporation securities. While much of this has been done for refinancing and liquidating old issues, the West, particularly, is seeing a substantial increase in new extension and new construction, due to large sums of money now being available for this work, which for 1922 may roughly be divided as follows: $100,000,000 for new hydroelectric development, $100,000,000 for highway construction, $100,000,000 for street improvements and $400,000,000 for new buildings, 20% of which is for new industrial construction, 40% for business and office buildings and 40% for new homes.

Association, the year 1922 bids well to exceed any previous year in the West as a market for electrical appliances of every nature, kind and form.

One Cloud that Darkens the Horizon

The one cloud that seems to darken the horizon of the West is the agitation in California over the proposed Water and Power Act, which will be an endeavor to sovietize California, in addition to embarking the state upon a $500,000,000 expenditure in a time when business men generally agree to the motto that there should be "More Business in Government and less Government in Business."

Consumer Ownership Emphasis Helpful

The great encouraging factor, however, is that consumer ownership of power plant securities is more and more becoming widely distributed in the West and people by the tens of thousands are now being numbered among the holders of utility stocks, whereas a decade ago the number perhaps would be limited to the hundreds column.

Cooperative effort, too, is being felt in the West. Great optimism prevails, due to the fact that our industry as a whole is a united industry and one that is set to advance forward, due to the fact that the precept is now thoroughly recognized of "Live and help live" in every branch of electrical activities. All of our great centers of the West, such as Denver, Salt Lake City, Vancouver, Portland, San Francisco and Los Angeles are experiencing the good effects of these cooperative leagues. Then, too, there is perhaps the greatest of all factors, namely, the underlying desire to render an ever-increasing service to the public. This has found expression in the institution of such ideals as the "Greater Service" effort of the Southern California Edison Company where forty men are constantly engaged in going to and fro in the districts served to find out the status of the public mind, to help adjust complaints, and to earnestly seek to cultivate the good will of the community served.

Present Industrial and Power Growth in the West

While the growth in California in power sales shows about 4½% increase during the current year in industrial load and from 25% to 30% in general plant output, it is not believed that this situation has prevailed throughout the eleven western states. However, in the Northwest and Intermountain districts the slight revival in the mining industry is helpful, and the reduction in taxes, both state and federal, due to the pressure being brought to curtail public expenditures, have begun to have their effect. In the Spokane district, for instance, the federal taxes paid in 1921 actually showed a decrease as compared with 1920.

Conclusions on the 1922 Outlook

In conclusion, then, we would say for the season of 1922 that the West is now ready for enlarged sales activities. The buying power of the average customer during the coming year will be as great or greater than last year, and in many instances, due to a greater reduction in costs of living than in income, will be greater than during the years 1919 and 1920.

The general spirit of optimism for the future which is gaining ground among all classes of business is going to be helpful in developing greater sales of electricity to commercial uses, but on the other hand in many lines of commercial power sales increases will depend not so much upon what the central station attempts today as upon the improvement in business conditions applying to the industry, and these business conditions can be bettered by our studying the economic factors that go toward helping to improve economies in production, and these factors as we know are largely basically electrical. It is evident that the results desired can only be secured by the active cooperation of the entire industry, not only from the jobbers but from all other elements in industry itself, and I think if we go afield and assume leadership in the bettering of these economic factors, we shall find that more and better business will be ours in deed and in truth in 1922.

For much of the data portrayed on the charts as set forth in this discussion the author is greatly indebted to Professor David F. Jordan of New York University, author of the recent book entitled "Business Forecasting."

Review of the Agricultural Prospects in Western States

Despite the Fact that Agriculturists in General Have Suffered More from Price Declines than Any Other Comparable Group the Outlook for 1922 is Bright

By HENRY C. BRECK
Assistant Federal Reserve Agent
Federal Reserve Bank of San Francisco

IN a region where the general prosperity depends so largely upon conditions in agriculture as it does in the Twelfth Federal Reserve District, which includes the states of Arizona, California, Idaho, Nevada, Oregon, Washington and Utah, it is particularly informing at the opening of another year, to review the condition and prospects of the farmer. Notwithstanding such outstanding exceptions to the rule as the grape, lemon, and apple growers furnish, it may be said that agriculturists generally have suffered more keenly during the past 18 months than any other comparable group in the population of this district. The crops of 1921 have been generally abundant, but the prices which they returned to growers were substantially less than the values received in 1920. A summary of the year's operations, with comparisons for 1920, appears in Table "I," from which the plight of the farmer is apparent.

It would be misleading, however, to conclude that the percentage figures in the last column of this table are a faithful measure of the farmer's actual condition and hence a reliable indication of the proximity of his recovery. The money which he received for his products was, it is true, far less than he received for his 1920 crop; but it is equally true that he paid considerably less in 1921 than he did in 1920 for the things which he consumed. Wholesale prices, at which the farmer sells his product, always decline faster and farther than retail prices, which he pays for the things he buys. Hence the decrease in his cost of living has not been commensurate with the diminution in his income, but it has gone far to mitigate the severity of his diminution. The chart on the next page illustrates the exteut to which the farmer's position in December, 1921, was less favorable than it was in 1913-1914, as it does also the extent to which he was better off in July, 1920, than before the war. He benefited when prices were rising and for several months after they began to fall, indeed until September, 1920. There is included also a table showing the latest figures published by the National Industrial Conference Board upon details of changes in living costs.

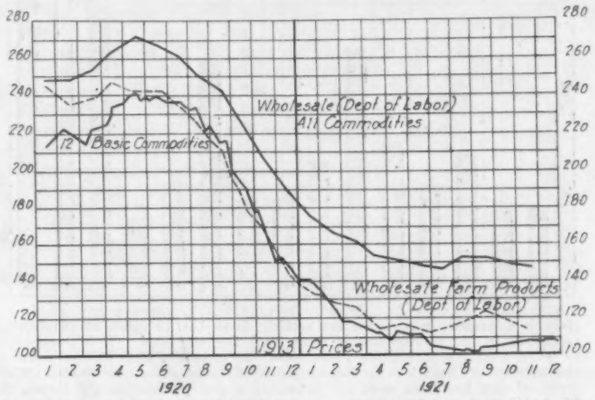


Chart I.—Movement of Wholesale Prices. Twelve basic commodities above are hides, cotton, wheat, corn, petroleum, pigiron, copper, lead, hogs, rubber, sugar and lumber.

The three-line chart entitled "Movement of Wholesale Prices" illustrates the discrepancies between the extent of decrease in the wholesale price of all commodities, of farm products, and of a group of 12 basic raw materials only part of which are of

Table I.—Yield of and Prices Received for the Principal Farm Products of the Twelfth Federal Reserve District in 1921 and 1920.

CROP OR PRODUCT	Yield (000 omitted)		Average Price Received per Unit by Grower		Aggregate Return Received by Growers for their Crops (000 omitted)		Percentage of Decrease 1921 Compared with 1920
	1921	1920	1921	1920	1921	1920	
Wheat—All (bushels)	122,045	100,232	$0.84	$1.378	$102,531	$138,156	25.7
Barley (bushels)	39,148	41,134	.553	.985	21,652	40,540	46.6
Oats (bushels)	34,343	44,398	.398	.714	13,682	31,724	56.8
Rice (bushels)	5,880	9,720	1.15	1.21	6,762	11,761	42.5
Hay—All (tons)	16,125	14,082	9.24	13.79	149,214	233,791	36.1
Cotton [1] (pounds)	54,453	130,000	.214	.30	11,690	39,000	70.0
Sugar Beets (tons)	2,496	2,868	6.521	12.67	16,287	36,340	55.1
Beans (bushels)	3,902	2,925	2.82	3.32	11,005	9,713	13.3 [2]
Potatoes (bushels)	35,371	39,445	1.022	1.074	36,179	42,361	14.6
Hops (pounds)	28,560	36,630	.241	.350	6,885	12,821	46.3
Apples—Commercial Crop (barrels)	11,761	7,379	3.769	3.686	44,333	27,193	63.0 [2]
Peaches (bushels)	14,781	15,188	1.114 [3]	1.969 [4]	16,467	29,912	44.9
Pears (bushels)	5,821	6,568	1.581 [3]	2.166 [5]	9,209	14,229	35.2
Oranges (boxes)	22,500	18,700	2.20	2.75	49,500	51,425	3.7
Lemons [6] (boxes)	4,664	3,750	3.86	3.06	18,003	11,475	56.8 [2]

[1] *Includes Lower California Figures.*
[2] *Increase.*
[3] *December 1st.*
[4] *September 15th.*
[5] *November 15th.*
[6] *California Fruit Growers Exchange Figures. Prices F. O. B. California Packing House.*

Table II.—Changes in the Cost of Living between July, 1914, and December, 1921
(National Industrial Conference Board)

ITEM	Relative Importance in Family Budget	Percentages of Increase in the Cost of Living above Average Prices in July, 1914, to—			Percentages of Decrease in Cost of Living on December 1, 1921, from Average Prices in—	
		July, 1920	November, 1921[1]	December, 1921	July, 1920	November, 1921[1]
Food	43.1	119	52	52[2]	30.6	(No Change)
Shelter	17.7	58	69	69	7.0[3]	(No Change)
Clothing	13.2	166	61	57	41.0	2.5
Fuel and Light	5.6	66	79	79	7.8[3]	(No Change)
(Fuel)	(3.7)	(92)	(92)	(92)	(No Change)	(No Change)
(Light)	(1.9)	(15)	(55)	(55)	(34.8)[3]	(No Change)
Sundries	20.4	85	78	78	3.8	(No Change)
Weighted Average of All Items	100.0	104.5	63.0	62.7	20.4	0.2

[1] *Revised.*
[2] *Food Price figures are for the 15th of the preceding month, from the United States Bureau of Labor Statistics.*
[3] *Increase.*

agricultural origin. It is highly suggestive when we turn from consideration of the present condition of the farmer to an appraisal of prospects for the year 1922. These are encouraging. Inspection of the chart discloses an unmistakable upward trend of prices for basic raw materials, amounting to approximately 8 per cent from the extreme low in August, 1920. Amelioration of the farmers' position through enhancement of his purchasing power will result from either (1) increasing prices for what he sells, (2) decreasing prices of what he buys, or (3) a combination of (2) and (3). Present indications are that the third, and of course the most rapid and effective of these tendencies, is likely to prevail in the coming months. Evidence is not wanting, indeed, to show that the agricultural communities have already "turned the corner." Borrowings of member banks from the Federal Reserve Bank of San Francisco are a trustworthy index of financial conditions in the communities which they serve. Chart III shows the course of borrowings during 1919, 1920, and 1921, of the city and country banks separately. It is noteworthy that during the whole of 1920 and the first 8 months of 1921,—a period when the country districts generally experienced the severest pains of the readjustment period, the country banks steadily increased their borrowings from the reserve bank. In August of the current year, however, when returns from the sales of 1921 crops became available, these banks began to reduce their borrowings and they have since made consistent and rapid progress in this direction.

Other than purely financial evidence also suggests that the worst of the agricultural depression is past. There has been an increase of about 20 per cent in the price of wool since the first of August; livestock during the past month has been bringing noticeably higher prices at the principal markets of the district, the tendency of cotton prices was upward in the last three months of 1921, and hides have nearly doubled in price since April, 1921. Freight rates on grains, hay, fresh fruits, wool and other farm produces were lowered on January 1, 1922 for an experimental period of six months.

The War Finance Corporation has been an important factor in extending credit to many agriculturalists and livestock men whose needs could not be met by the use of six-months commercial credits

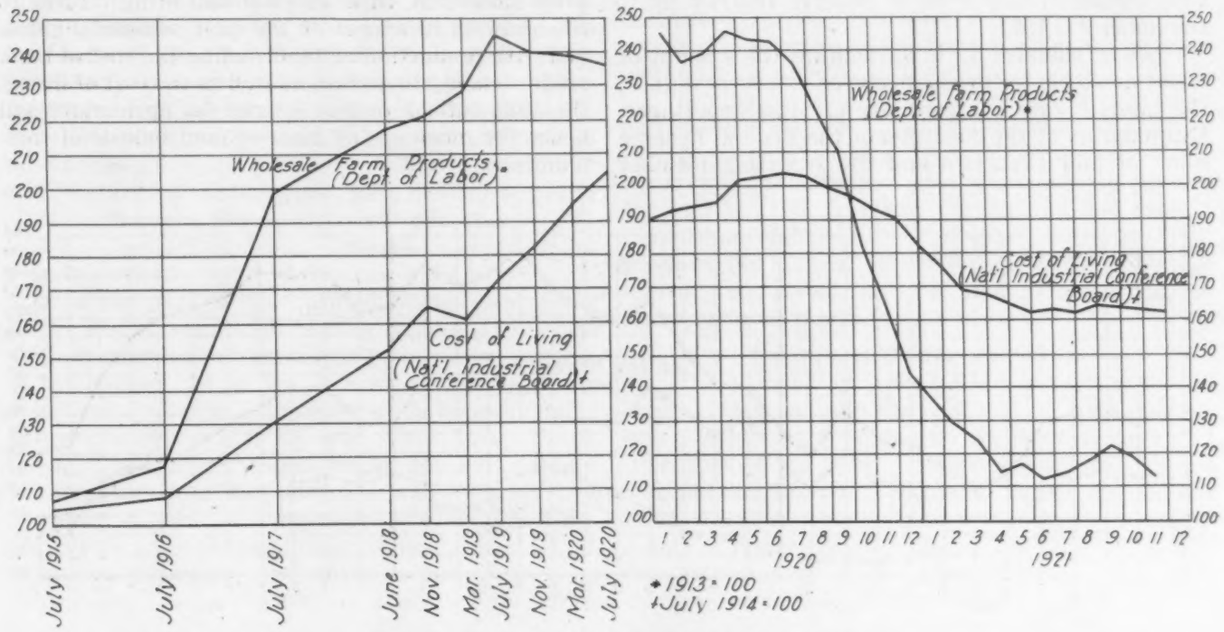


Chart II.—Wholesale Farm Prices and the Cost of Living

of the character declared eligible in the Federal Reserve Act for rediscount with the Federal Reserve Bank. Table III shows by states of this district and in summary form by commodities, the exact amount of credit assistance furnished by the War Finance Corporation in this Federal Reserve District up to December 31, 1921.

Table III.—Loans approved and Advances made by the War Finance Corporation in Twelfth Federal Reserve District to December 31, 1921.

	Approved	Advanced
CALIFORNIA		
Cooperative Canneries	$ 700,000	$ 576,753
Prune and Apricot Growers Association	1,250,000	.....
Rice Growers	1,250,000	920,784
Livestock	827,185	483,279
	$ 4,027,185	$ 1,980,816
ARIZONA		
Cotton	$ 1,200,000	$ 581,591
Livestock	700,000	689,611
	$ 1,900,000	$ 1,271,202
NEVADA		
Livestock	$ 248,000	$ 248,000
OREGON		
Wheat	$ 1,500,000	$ .....
Agriculture and Livestock	1,867,350	1,444,130
	$ 3,367,350	$ 1,444,130
WASHINGTON		
Wheat	$ 6,000,000	$ 781,137
Agriculture and Livestock	84,000	84,000
	$ 6,084,000	$ 865,137
IDAHO		
Wheat	$ 1,500,000	$ 537,653
Agriculture and Livestock	564,500	432,496
	$ 2,064,500	$ 970,149
UTAH		
Sugar	$ 8,596,000	$ 6,904,000
Agriculture and Livestock	1,219,755	329,043
	$ 9,815,755	$ 7,233,043
TOTAL	$27,506,790	$14,012,477
ARRANGED BY COMMODITIES		
Cooperative Canneries	$ 700,000	$ 576,753
Prune and Apricot Growers Association	1,250,000	.....
Rice	1,250,000	920,784
Cotton	1,200,000	581,591
Sugar	8,596,000	6,904,000
Wheat	9,000,000	1,318,790
Agriculture and Livestock	5,510,790	3,710,559
	$27,506,790	$14,012,477

As in industry so in agriculture the amount of credit available for productive uses and its cost (i. e., the interest rate charged) are of vital importance. Examination of the condition of the Federal Reserve Bank of San Francisco and the reporting member banks of this district at the end of December, 1921, as compared with the end of December, 1920, reveals at once the vast improvement in their condition during the past year and the abundance of credit available for the coming year whenever legitimate agricultural or industrial oportunities for its employment are afforded. The essential items in the condition of the reporting member banks and the Federal Reserve Bank appear in the following brief tabulation.

Table IV.—Reporting Member Banks—Twelfth Federal Reserve District

(In Thousands of Dollars)

	December 28, 1921	December 31, 1920	Per Cent Increase or Decrease in 1921
Number of Reporting Banks	64	66	
1. Total Deposits (excluding Govt.)	$1,166,596	$1,143,769	+1.5
2. Total Loans and Discounts and Investments (excluding redscounts)	1,227,607	1,201,468	+2.2
3. Cash (in Vault and with Federal Reserve Bank)	79,662	104,735	—23.9
4. Total Borrowings from Federal Reserve Bank	34,229	108,470	—68.4

Federal Reserve Bank of San Francisco

(In Thousands of Dollars)

	December 28, 1921	December 30, 1920	Per Cent Increase or Decrease in 1921
1. Total Reserves	$283,758	$187,717	+51.2
2. Loans and Discounts	92,054	211,953	—56.5
3. Investments	10,680	13,724	—22.2
4. Federal Reserve Note Circulation	244,252	270,745	— 9.8
5. Reserve Percentage	76.8	51.1	+25.7

Not only is credit in adequate, indeed abundant, supply, but rates of interest are substantially lower. The Federal Reserve Bank of San Francisco now rediscounts all classes of paper at 5 per cent compared with 6 per cent in January, 1921, and the rates of interest reported as customary by the principal city banks of the district, show a comparable decline.

Predictions of 1922 crop yields at this early day are but little better than guesses. The season has been favorable to date, however, and there is no cause for anticipating other than normal yields. If basic raw materials continue their present upward price movement, these crops should bring returns to the growers in excess of the past seasons' figures, and with production costs, including the cost of bank credit, tending to decline, as well as the cost of living, the 1922 outlook in this district for agriculture and hence for much of the business and industrial community is bright.

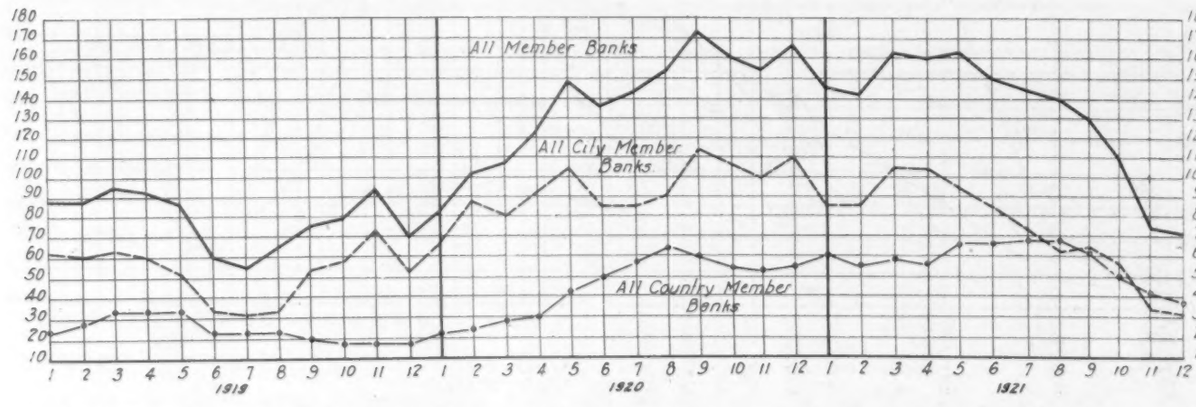


Chart III.—Comparative Chart of Rediscount Operations for Three Years 1919-1921 (in millions of dollars). City banks include all member banks in San Francisco, Los Angeles, Portland, Seattle, Spokane and Salt Lake City. Country banks include all other member banks.

Prospects For 1922 Indicate Improvement in Lumber Market

Analysis of the Timber Supplies of the Nation Shows that Western Forests Which Are Present Timber Reserves Will Furnish the Bulk of the Lumber Marketed During the Next Fifty Years

By DAVID T. MASON
Forest Engineer, Portland, Oregon

THE history of the lumber industry in the United States shows a movement of the center of production from one forest region to another with the growth of the population of the country and with the depletion of the timber resources of the various regions. The industry was first of greatest importance in the Northeastern States which were the main producers from colonial days until 1870. Before 1880 the Lake States became the most important producing region, and for two decades furnished approximately 35 per cent of the lumber needs of the country. By about 1900 the Lake States had fallen off in production and the Gulf States had increased their production until the two regions were each furnishing approximately 25 per cent of the country's needs. At this time the Western States were furnishing only about 10 per cent. By 1910 the Lake States had sunk to minor importance and were succeeded by the Gulf States as the leading producers; from 1910 until 1920 the Gulf States furnished approximately 35 per cent of the product. After 1900 the cut in the Western States increased rapidly until at the present time it is just about equal to that of the Gulf States, which have passed the zenith of their production and from now on will decline in importance in the per cent of lumber which they furnish to the country's markets. On the other hand the West, which already equals the South in producing about 35 per cent of the lumber, will continue to increase its output for a number of years.

Western States Future Producers

The Western States will become more and more prominent lumber producers because the timber supplies of the part of the United States east of the Rocky Mountains are all heavily depleted, while the western supplies constitute the great timber reserve of the nation. About 20 per cent of the remaining soft wood timber is in the East while approximately 80 per cent is found in or west of the Rocky Mountains. The location of western timber and western logging operations is of some interest. The Douglas fir region of western Oregon and western Washington between the ocean and the summits of the Cascades has approximately 700 billion feet of standing timber and is annually cutting about 9 billion feet. The Inland Empire which includes the water shed of the Columbia River east of the Cascade range in the states of Oregon, Washington, Idaho, and Montana, has slightly more than 300 billion feet of timber and is cutting approximately 1.5 billion feet annually. California has slightly less than 300 billion feet of timber and cuts approximately 1.25 billion feet annually.

Western Timber Supplies

At the present rate of cutting the virgin timber supply of the West would last for about 100 years. However, as the timber supply in other regions of the United States becomes exhausted it is anticipated that the country will continue to draw heavily on western forests and that the increased cut in the West will be such as practically to exhaust the western supplies of virgin timber in about 50 years. The rate of cutting has within the last few years increased materially in the Douglas fir region but not much in the other regions of the West. It is believed that it will continue to increase steadily in the fir region and that also there will be a considerable increase in the output of the California pine region within the next few years.

It is of interest to note that within the past two or three years a number of the most important Gulf States operators have become heavily interested in western timber and in western lumber manufacturing. No doubt other southern operators will come west as their present supplies of timber are exhausted, for this has always happened when the center of production of the industry has moved from one region to another in the past.

The lumber industry of the West has been more or less seriously influenced in a number of ways in the recent past. Two years ago the prices and demand were the highest ever experienced. Before the end of 1920, however, the demand had greatly diminished and prices had dropped below cost for much of the lumber. During 1921 conditions in the industry improved, but are still below normal in many parts of the West.

Conditions During Past Year

The increase in railroad freight rates on all commodities made in the summer of 1920 has adverely affected the lumber of the West as compared with that of the South, for the percentage increase was applied to widely different rates—that of the South being much lower, of course, to the principal points of lumber consumption in the Mississippi Valley and on the North Atlantic Coast. This rate increase on account of the manner in which it was

made gave the southern pine operators an additional advantage over the western operators by from $2 to $3 per thousand feet of lumber.

A large share of the lumber production of the country is consumed on the farm. The exceedingly serious condition of the farmer recently has greatly curtailed the consumption of lumber on the farm. This situation has been of much more importance to the pine mills of the Inland Empire than to the tide-water mills in the fir and the redwood regions, for the exceedingly rapid development of southern California in the past year or two has increased its lumber consumption to approximately a billion feet, thus helping to maintain an outlet for those mills which are able to ship by water.

A typical virgin forest of the Northwest. The Douglas fir region of Oregon and Washington, between the Pacific and the summit of the Cascades, has approximately seven hundred billion feet of standing timber, which is now being cut at the rate of nine billion feet annually. It is estimated that the western timber will last about fifty years.

The increase of rail rates and the decrease of water rates have enormously increased lumber shipments to the East Coast by way of the Panama Canal during the past year. During 1920 approximately 15 million feet of lumber was sent from the West Coast to the East Coast through the Canal. During 1921 such shipments probably amounted to something like 175 million feet. A further great expansion of this business is anticipated.

Improvement During Past Year

During 1921, as compared with 1920, the export of lumber from the West Coast increased greatly to Japan, the Philippines, Egypt, India and New Zealand; it decreased greatly to Europe, South America, Africa, Cuba, China and Australia. The water shipments for 1921 have probably been slightly greater than those of 1920. Water shipments would have been still larger but for the seamen's strike last spring. The total water shipments from the West Coast for 1921 probably amount to approximately 1.6 billion feet, the final figures not having been compiled at this writing. About half of this total is coastwise traffic to California ports.

Normally about 85 per cent of the lumber production of the West is marketed by rail shipments; and it is the rail business which has been especially hard-hit in the year of depression through which we have just passed. On the basis of the most recent reports from the various regions it is estimated that rail shipments during 1921 were only about 60 per cent of normal. All shipments, water and rail combined, were about two-thirds normal.

Among the important developments in the industry recently is the continued application of electric power both in logging and in sawmill operations. As electric power is developed and made available on a larger scale in the West no doubt the industry will use it more and more.

Another interesting recent development is found in the announcement of three California redwood companies that they plan to manage their timber properties for the perpetual production of crops of timber, the object being a permanent supply of raw material for their manufacturing plants. Several other redwood companies are making a careful study of the possibilities of permanent forest management on their lands. Some of the latter also will probably adopt in the near future a permanent forest management policy. It is believed that a number of the operators in the Douglas fir and California pine regions will eventually do the same thing. The enormous increase in population which is sure to take place on the West coast during the next fifty years and the rapid depletion of virgin timber supplies throughout North America are certain to provide good markets for those who have second growth timber ready for cutting during the last half of the present century.

Prospects for Coming Year

The demand for lumber has increased considerably recently. The prospects for 1922 in the lumber industry appear to indicate a considerable improvement in the market. Although the farmer is still in bad condition, the fundamental situation remains that the country has failed for the past five years to do a normal amount of building. The shortage in the use of lumber amounts to many billion feet. Furthermore, there is a shortage of stock in the hands of retail lumbermen. It appears likely, therefore, that the next year will see a steady improvement in the lumber market situation. This is decidedly important to the West for to a greater extent than is commonly realized the prosperity of the West is tied up with the lumber industry which is the principal activity of northern California, western Oregon, western Washington, northern Idaho and western Montana, giving employment to many men and consuming large quantities of supplies of various sorts.

Prospects of Canning Industry are Brighter than Last Year

Although Volume of Future Orders for Canned Fruits is Based on Eastern Crops, Conditions Appear Favorable for the Marketing of a Normal Pack During the Coming Year

By ELMER E. CHASE
President, Canners' League of California

ABOUT one hundred and ten years ago Nicolas Appert of Chalons-sur-Marne, France, developed the art of preserving various types of perishable foods through the use of heat and hermetically sealed containers. This was the beginning of the canning industry. The progress, however, since that date was very slow until scientists about 1890 became interested in the subject and succeeded in solving many canning problems. Since 1890 its growth has been phenomenal.

Electricity has played its full part in the development of the industry during the last decade, as it has made it possible to practically eliminate overhead shafting, pulleys and belts and has permitted the connecting up of machinery in units which is a much more dependable, economical, sanitary and efficient manner. There is less machinery used in fruit canning operations, however, than in canning other products due to the fact that most of the work must be done by hand since the quality of the fruit is not determined so much by size as it is by color, flavor, texture, symmetry and other factors that are of the utmost importance in establishing the grades.

West Great Canning Center

The Western states, particularly California, have become the great fruit canning center of the world and we are now producing most of the canned fruits that go to supply the tables of our own people and in addition we are exporting quite a percentage of our pack. During the past ten years, the output of canned fruits in California has more than doubled and the combined average annual output of canned fruits and vegetables would pave a solid pathway from San Francisco to New York about two feet in width.

The most expensive pack of canned fruits since the industry was placed on a commercial basis was made in the season of 1920. During that season the highest known prices were paid for fruits, sugar, boxes and labor. In June, when prices are normally made, in spite of the fact that they were above anything in the history of the business, there was a very good market and excellent prospects of selling out the entire pack at a fair margin of profit. But in August sugar started on the toboggan and prices rapidly fell, until in a few weeks sugar was worth only about 40% of its former value. Many other items of merchandise, particularly coffee, tea, rice, spices and canned fruits were carried down with sugar. The result was that only about 70% of the 1920 pack had been sold by the end of the year and January 1st, 1921, found the canners facing a very serious situation as they were holding 30% of the 1920 output with no market in sight. It was realized that severe reductions would have to be made in prices if these goods were to pass into the hands of the consumer before the 1921 pack was placed on the market.

The total pack of canned fruits in 1920 in the states of California, Washington, Oregon and Idaho was in excess of thirteen million cases. In February it was estimated that there was a carryover of 3,066,871 cases out of a total of 11,382,863 cases in California.

Due to a moral obligation to protect the wholesalers who had purchased the bulk of the 1920 pack at extremely high prices, no attempts at liquidation were made until well into the spring months of 1921 when canners started to liquidate their holdings and found it necessary, in order to do this, to cut the price of canned fruits about 50 per cent. As it turned out, this was probably the best move that could have been made, for it resulted in attracting the attention of wholesalers, retailers and consumers to such an extent that the 1920 carryover had largely moved into consuming channels before prices were named on the 1921 pack.

Frost Damage to Eastern Crops

Fortune further favored western canners through the heavy damage done to the eastern fruit crops by frost, and this made it possible during the past year to not only clean up the 1920 carryover, but also to place the bulk of the new pack at fairly good prices. It is estimated that the present carryover on canned fruits is about normal, which means that it is very much less than the carryover of one year ago.

The prospects for the coming season are very good, as it is very evident that stocks of canned fruits in the hands of the trade are much lighter than usual at this time of year. If costs of supplies for the coming season are reasonable it will mean that 1922 canned fruit prices will be closely in line with present prices and this will undoubtedly give us a market for a normal pack in 1922.

In my opinion, it would be fatal to the merchandising of our canned fruits if prices were increased much above the present level. It is going to depend very largely on the eastern fruit crops as to the volume of future orders that will be placed by wholesalers during the coming season.

Since 1920 and the fore part of 1921 is a period everyone having anything to do with canned fruits will be glad to forget as far as possible, and with the knowledge that we are now on a normal basis canners are happy in the thought that they can look forward in 1922 to a much brighter prospect than was evident a year ago.

Review of the California Oil Industry During Past Year

Due to the Development of Fields in the Vicinity of Huntington Beach and Elk Hills, Oil Production During 1921 Has Exceeded Any Previous Twelve Months Period

By WALTER STALDER
Consulting Geologist

OIL production in California during the year 1921 exceeded that of any previous twelve months since the discovery of this substance in the state. Exact data for the month of December are not available at this early writing and an estimate of that one month's production has been made. Conservatively, this estimate will place the production for the year at between 113 million and 114 million barrels. These figures would have been considerably higher but for the interruption of production by an oil workers' strike in the San Joaquin valley and in some of the coast fields during the early fall. All of these conditions are revealed in the curves which accompany this summary.

The cause for the increase in production is attributable mainly to developments in the Elk Hills and in the Huntington Beach districts. In the former the exploitation of privately owned lands within the boundaries of Naval Reserve No. 1 led to the usual offset wells on adjacent privately owned lands and on lands leased from the United States government by competitive bidding. In the Huntington Beach field production was increased by intensive drilling along a hidden fold in which town lot drilling was a feature. Toward the close of the year the Signal Hill district to the northwest of the Huntington Beach field and in the north part of the town of Long Beach came in and also the new district near Santa Fe Springs on another hidden structure. All of these later fields are in Los Angeles county. Both the Signal Hill and the Santa Fe Springs areas will doubtless show their importance one year hence when the production of 1922 is recorded.

Supply and Demand Control Production

The accompanying curves when studied in connection with the history of the oil industry in California reveal some very important facts. One of these is that the field price of oil has not been made by manipulation in the past but its increase or decrease is really controlled by supply and demand. It is noted that when oil stocks have increased prices have decreased and conversely when stocks have decreased prices have increased. Another interesting condition is the comparatively low price of oil from the beginning of the curves up to the war period of 1916. This period of low prices and over-production while a hardship to the operators nevertheless educated them to the difficulties of all phases of the industry from prospecting to marketing and protecting themselves, legally and even politically when necessary. The existence of these hardships has resulted to the good of the state in so far as only those best fitted for the industry have survived, that operations have been carefully carried on, that higher and more economical uses and methods have been developed, that excessive production with its corresponding disadvantages has largely been avoided and during the period of very low prices in the mid-continent and Rocky Mountain districts,

The discovery of oil in the Elk Hills district added materially to the production of petroleum in California. The view above is Tupman wells of the Standard Oil Company.

during the year just passed, great over-production in California has so far been absent.

Such over-production has also been retarded in the past in an indirect manner through litigation in connection with government lands, the operation of properties by government receivers, and the lack of a workable oil land leasing bill. The clearing away of litigation in regard to certain government lands and the acceptance of leases by many of the claimants rather than a further legal contest is resulting in increased developments. Where the government receiverships have been dissolved and properties returned to regular oil field management new developments and increased production will undoubtedly again result. The oil land leasing bill which is now in operation has opened the way to new prospecting and to initial developments in new as well as in already proven districts. Many of these new ventures will be failures but those that are successful will certainly add new districts to the state.

Although a strange anomaly, we now find the United States Government actually in the oil land leasing business in connection with properties that all through the war period were reserved for future

A section of the Huntington Beach oil wells where the derricks rise among the bungalows. (Courtesy Standard Oil Bulletin.)

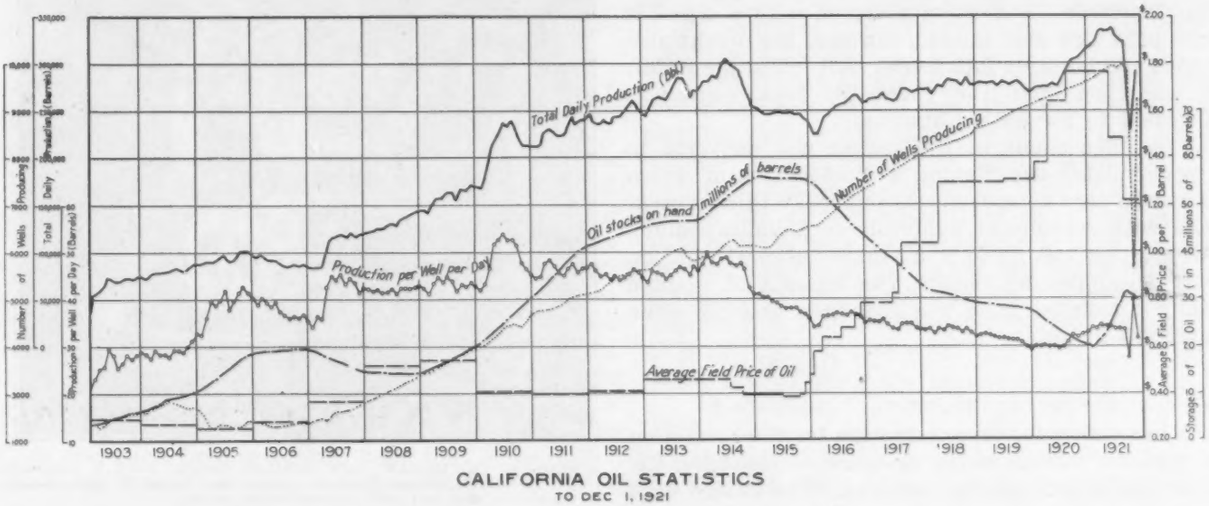
fuel oil for the United States navy. As previously mentioned, private developments on adjoining lands has seemingly made this necessary. For the future conservative control of the industry as well as a future fuel supply for the navy the effect of this policy will be important to watch.

To the operator who in the past has learned what excessive over-production really means the almost simultaneous removal of many of the hinderances to production by enactment of the oil land leasing bill, the cessation of government litigation in regard to many claims for public lands developed under the old placer mining law and later withdrawn from entry, as well as the beginning of development on government holdings within the Naval Reserves, will shortly have a very important effect on oil production in California, its markets and its prices. Some of the increased production for the year 1921 is attributable to these causes.

Attempt at Political Control

An important event to the California oil industry as well as to the country at large was the defeat of certain proposed legislation within the state which would declare the oil industry a public utility and place it under the control of the state railroad commission. The principal contention of the sponsors for such bills was that the prices of oil and the products thereof were manipulated to the disadvantage of the consumer. A presentation of the facts, some of which are revealed by the accompanying curves, convinced the legislature that such legislation was not necessary or proper. Had such legislation been passed it would have had its effect on future production and oil prices and it is questionable if such political control would ever benefit either the producer or the consumer.

The oil strike which caused a sharp decrease in production during the two months that it lasted was called on September 10, 1921, by the oil workers under the leadership of an advisor who was not experienced in the oil business. This strike was not called because of any misunderstanding relating to wages or working conditions, but because of a refusal on the part of certain operators to acquiesce to the continuance of war-time government arbitration in any dispute that might arise in the future. The strike did not affect some of the largest operators, but others it did and was applied principally to the San Joaquin valley and some, but not all, of the coast fields. From the standpoint of success to the union men this strike was ill-timed in so far as a curtailment of production at this particular period was a decided advantage to the industry for, as will be noted on the curves, oil stocks were rapidly mounting and the resultant over-production would shortly cause demoralized markets. The idle wells, resulting from the strike, most of which were the poorest producers, served to offset this over-production dur-



CALIFORNIA OIL STATISTICS
TO DEC 1, 1921

ing the period that it lasted. Had it continued longer it would have resulted in drawing more storage oil and would have made room for stocks that are daily increasing at the present time.

From the standpoint of the oil operators this issue had to be settled some time and the sooner solved the better. It died out two months after being called and what is known as the American plan wherein the operators "hire and fire" whom they will is in operation.

To those who have been pessimistic in the past regarding the future possibilities of California production, the development of new districts in Los Angeles county, some of which are on hidden structures, must have been considerable of a surprise. In the past California has always produced sufficient oil to supply her markets and whenever called upon has been able to more than meet any emergency, even the great draft on her resources occasioned by the war. During the last seven years the Montebello, Richfield, Huntington Beach, Signal Hill, Santa Fe Springs and Elk Hills oil districts have been brought in. These fields are already causing some concern on the part of those vitally interested in the industry because of the rapidly increasing storage. There is good reason to believe that beneath the San Joaquin valley around the margin of which some of the most prolific oil fields have been found, hidden structures may exist. Should new and hidden fields be found by drilling in this wide expanse it will considerably swell future production. There are other possibilities in organic shale and other sedimentary areas in the coast districts from San Francisco south. What northern California, particularly about the Sacramento river drainage in the sedimentary areas, may bring forth is not known. When market conditions require the development of new fields there is a vast amount of territory to be tested in this state. The easily discovered fields have been mostly developed and prospecting in the future will be more venturesome. It is with knowledge of past developments and a realization of some of these future possibilities that there is good ground to state that the true potential of California is not known other than that it is extremely large and it is idle to endeavor to estimate either ten, fifteen, forty, or any other number of years as the future life of the industry in this state.

Metallic Sodium Formed in Sea Water

Charged Wire Used for Welding Exposed to Washing of Tide Forms Metallic Sodium From Crust of Sea Salt

By EDWIN ROEDEL
Chemist, Bethlehem Shipbuilding Corp.

WHAT a flood of "It can't be done"s will greet the assertion that under the wharves of the Bethlehem Shipbuilding Corporation metallic sodium has been formed in the presence of sea water. A wire carrying a current of 700 volts for electric welding was bared of insulation at one point under the wharves where it was exposed to alternate washing by the tide, and subject to moistening by capillary attraction. The power house soon discovered a "leak" of some 125 amperes and in searching for it found a growth of about 8 in. in diameter, as shown in the accompanying cut, around the non-insulated point on the wire. A workman was sent to chip off the "barnacle," but when attacked with a chisel it spit back fire and caustic, burning the workman's hands and bursting into flames as it fell in the water. It was then that the chemistry department was appealed to for an explanation.

A huge chunk of the sample was delivered to the chemistry department, a cross-section of which showed a very heterogeneous composite thickly pocketed with deposits of light colored metallic sodium. An analysis was made of a sample taken at random, with the following results, the amount of sodium being calculated from the hydrogen evolved when dissolved in water:

Sodium	29.3%
Sodium Hydroxide	58.5%
Sea salt, by difference	12.2%

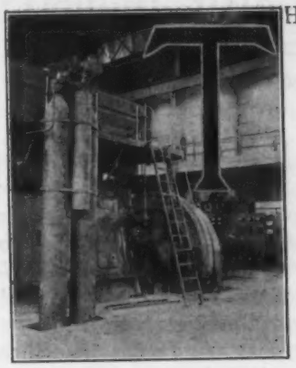
In seeking for an explanation for the formation of metallic sodium in the presence of moisture, the following hypothesis was evolved. The heated wire must have evaporated the water reaching it through capillary attraction or otherwise, and formed a gradually thickening crust of sea salt, sufficiently moistened to form a good electrolyte. The sodium formed was undoubtedly partially decomposed at first, but the continuous evolution of hydrogen and the incrustation of caustic and salt prevented with increasing effectiveness the access of water, thus accelerating the "growth" as the deposit thickened, and perhaps even reconverting some of the caustic to sodium. In any event, the phenomena should be one of interest to engineers, as well as chemists.

A section of the "barnacle" eight inches in diameter which is composed largely of metallic sodium. How the sodium was formed in the presence of moisture is explained in the accompanying article.

Western Mining Operations are Definitely on the Upgrade

General Improvement in Economic Conditions Will Result in Increased Demand for Base Metals, Notably Copper, Causing a Resumption of General Mining Activities

By FRANK L. SIZER
Mining Engineer



THE optimism of the miner is proverbial. If it were not strong in the heart of every man engaged in the winning of metal from the ground, there would be a much smaller number engaged in the occupation of digging and reducing the common ores found in the mining field. We all know how the hope of striking pay in the next round of holes has sustained many a prospector and made him ignore privations, year after year, serenely confident that there are better days ahead. In the same way, in a larger degree, mining companies often continue their operations beyond the point where good judgment dictates and risk a year's loss, rather than to shut down entirely, lose a good organization and later make a fresh start under conditions made more difficult by new problems. This has been the situation in which many mining companies found themselves during the past two years and 1921 has been a particularly discouraging year. I have been asked many times, whether it is a reasonable hope that 1922 will be a better year for the mining industry, and I have answered, "Yes, it must be better for I do not see how it can be worse!"

Many circumstances have combined to force continued hardships upon the mine operators and the recovery from conditions, which were the natural consequence of the war, has been tedious, so slow in some cases as to be imperceptible. Beginning with 1919 we had hopes of relief from the labor shortage which, borne patiently by all through the war period, we had a right to expect would make a quick change for the better soon after demobilization. Then came strikes and demands of the unions, in many cases difficult to settle quickly and amicably. During the war we were compelled to put up with inefficient mining labor, not only because men would not do a fair day's work but for the additional reason that men were taken from other occupations and placed in the mines, and their training was at the expense of the operator. This resulted in increasing the cost of production, already much higher because of the rise in the price of all supplies necessary in the industry, until the total cost became prohibitive. Only those mines which could better afford to run on a limited scale, rather than to shut down entirely and pay a heavy cost for idle maintenance, continued in operation, hoping against hope that some radical change in the controlling factors of cost would enable them to tide over the most unfavorable period in mining that has been known in the past ten years. In the fall of 1920 came the concerted action of all the big copper mines, when a suspension of production was admittedly the only means of saving the industry from total collapse. The smaller copper mines had already been obliged to suspend. The closing of many custom smelters was the last straw, not unexpected but inevitable. In many cases the suspension of mining had pretty nearly destroyed the life of what had been flourishing communities. The steady reduction of the copper surplus has been a hopeful sign and now with extensive plans for hydroelectric development in many localities, notably the Colorado River, and the distribution of the electric current over a radius of five hundred miles, there is a practical certainty that by the middle of 1922 we shall see all of the copper mines in operation again. The absorption of American Brass Co. by the Anaconda Mining Co. is evidence of a plan on the part of one of our largest copper producers to make certain its own domestic market, since we are advised in print that the metal requirements of the American Brass Co. are greater than all the copper which Anaconda can produce. In a similar manner, it is not unlikely that the copper producers of Arizona will, in the near future, equip and operate mills to produce the finished products in brass and copper, particularly after the assurance of cheap and unlimited power which will be available from the Colorado River project. These plans, including the distribution as well as the installation requirements of so vast a project as that on the Colorado River, insure a much larger domestic consumption of copper in the next ten years and we are therefore less concerned about the export demands, which naturally have been slow in reaching a pre-war basis, by reason of the abnormal rate of exchange and the disturbed condition of all Europe.

Now we are told by all financiers that business conditions are better, that the year 1922 has a brighter outlook and that we are already on the upgrade, with prosperity in sight. Admitting that this is so, the conclusion is inevitable that the base metals, and notably copper, will be in such demand as to make certain the resumption of all mining and smelting companies before the end of the year. My answer, therefore, to the question, "Is mining on the improve?" is logically "Yes," without any possibility of a reactionary movement and with a reasonably stable price for the metals.

In the case of precious metals, the situation is a little different. So long as the price of one dollar per ounce for silver is maintained and with the growing demand for gold and platinum in the arts, we

need have no fear but that mine operators will meet it; in fact the report is already in hand, advising us of the increase in gold production in California for the year 1921. A statement made recently by a prominent mining engineer who is in close touch with large scale operations, is that the decrease in cost of mine labor in the past year has been from 12 to 15 per cent and that mining supplies generally have decreased 20 per cent. This furnishes encouragement for new mining enterprises and, in my own range of observation, there is more disposition to give serious consideration to all sound mining projects, planning future expansion rather than retrenchment.

Better Conditions Ahead for the California Cattle Industry

Improved Financial Conditions as a Result of Liquidation, Prospects of Abundant Feed for the Coming Year, and Improved Labor Conditions Will Benefit Cattlemen

By R. M. HAGEN
Secretary, California Cattlemen's Association

CALIFORNIA cattlemen have been exceedingly fortunate during the past year, compared with cattlemen in other parts of the United States. Not only have feed conditions been exceedingly good throughout the season, but the price received for cattle has been comparatively higher in California than at other points. In addition to this, financial conditions have been better in California than at almost any other point in the United States. True, not all cattlemen have been completely satisfied with the condition of affairs, that is only human nature and to be expected. In general, however, the cattleman who has been in the business for a number of years and who is expecting to stay in during the years to come, finds himself in good condition and quite well satisfied with his receipts for the past year.

The exceedingly dry fall has caused a shortage of feed in some parts of the state, but no serious conditions have developed. The rains during the month of December have again insured a successful feeding year for 1922, and with improving financial and labor conditions and a return to active business conditions in other lines, the cattleman has a bright future ahead of him.

The supply of cattle in California is still showing a shortage, and while normally everyone is fully supplied with both feeder and stocker cattle at this season of the year, there still remains a strong demand for both classes of stock. This shortage of cattle exists not only in California, but also in adjoining states. Nevada is not feeding as many cattle as usual this winter as is also true in the case of Utah. Arizona and New Mexico also report a shortage of cattle, while the states to the north of California have abundant feed and find it necessary to bring in some Canadian cattle, in spite of the tariff, in order to consume the feed on hand.

The financial situation seems to have crippled the livestock industry in the middle west and intermountain states, particularly in Idaho. Strenuous efforts are being made to relieve the situation there by the War Finance Corporation cooperating with the loan companies. This is very gratifying to the California cattleman, for if the financial condition of the stockraisers in these states were not taken care of, there would be great danger of a surplus of cattle being shipped into the California markets from that section. At present there seems to be no immediate danger of such an unfortunate thing happening. It appears that plans will be carried out for the proper financing of the livestock industry and that it will not be necessary to further sacrifice young cattle and breeding stock because of lack of sufficient funds. This is most fortunate, because a further depletion of the breeding stock and calves would decrease the available beef supply for the coming few years, which would ultimately result in the increased price of beef to the consumer.

The California Cattlemen's Association is aiding the cattlemen of California in many ways during the present readjustment period. The state office, located in San Francisco, acts as a clearing house for information and service to the several thousand members of the Association. A weekly market bulletin is sent to every member of the Association; cattlemen are assisted with transportation problems, are assisted in securing feed, feeder or stock cattle; as well as in their financial difficulties which are being relieved by the War Finance Corporation.

The cattle industry at the present time is going through a period of readjustment that works hardships on those individuals who are not established on a sound basis. Hard work, the adoption of better business policies, and economical production, are the things that will put the industry on a sound and profitable basis in a comparatively short time. The cheerful side of the picture is that the livestock industry probably reached a condition of 100 per cent liquidation sooner than almost any other industry. That being the case, the rebound will begin that much sooner and a normal condition will be attained before the other industries reach that enviable condition. This very fact is being more and more realized by the banks of the state. They are taking the position that since 100 per cent liquidation has been accomplished in the livestock industry, cattle paper is therefore on a sound basis, and is one of the best securities which can be taken at the present time. The result is that more and more much needed long-time credit is being extended to cattlemen in order to carry their depleted breeding herds and young stock, that their herds may be rebuilt to normal size and quality.

Manufacturing Load Shows Industrial Market for West

Survey Covering 5,221 Large Industrial Plants of the West Indicates Wide Extent of Manufacturing Activity Based on Abundant Supply of Raw Materials. Popularity of Power Company Service.

MINING and smelting stood first among industrial power loads of the western states for 1921, with an installed capacity of 588,886 hp. Lumber mills used 180,457 hp., while the preparation of food products of various kinds, including canning and flour mills, required 160,799.6 hp. These figures are revealed by a survey conducted by the Journal of Electricity and Western Industry, the results of which are listed in the accompanying table. Names of 5,221 of the largest industrial plants of the West were used as a basis for the investigation. Of these, information on the installed capacity was available for 1,916 plants, together with information as to whether the plants were enjoying power company service or maintained isolated plants of their own.

The totals cover plants using 1,419,771.62 hp., all of them with an individual capacity of 100 hp. or over. Of these, 1,135,082.57 hp. or 83.3 per cent derived their power from central station lines, while 251,565 hp. or 17.7 per cent was served by plants operated by the establishments themselves. The figures as given are very complete for the states of Oregon and Colorado for all plants using 100 hp. and over. Owing to the great manufacturing activity of California, the list was confined to plants using 200 hp. and over, of which a comprehensive survey was made. Government figures for Utah make it possible to give accurate totals, although individual returns for the state were incomplete. The Superpower Survey, covering the states of Oregon, Washington and Idaho, and Mr. Ralf R. Woolley of the Reclamation Service at Salt Lake City are to be thanked for supplementary material on their respective states, as well as power companies and industrial plants in all parts of the West, who cooperated in securing the data requested. It is believed that this listing and the analysis of figures based upon it is the most comprehensive ever made for this district. It is hoped at a later date to extend the investigation in the hope of making it practically complete for the entire western territory. A complete listing of all plants upon which data are available in regard to the hp. installed capacity will be found on pages 131 to 138 of this issue.

State Distribution of Industries

California stands first among western states in the number of its plants of large size, something over 2200 being included in the list. These cover every line of activity, food products easily taking the lead in the number of establishments, although not in the size of plant. Metal industries, including machine shops and foundries, come second with 337 plants, while sawmills and wood product plants run a close third with 334 concerns. The chemical industry is represented by 194 factories, cement and clay products with 131 establishments. Significant figures are those which indicate the size of the canning and packing industry, flour mills and grain products, mines, oil refining, refrigerating plants, textile industry, paper products and sugar mills.

Washington ranks second in the number of large plants, with nearly 1000. Lumber and wood products predominate here, with salmon and other food canning and packing in second importance. There is considerable activity in flour milling and grain products throughout the state and Seattle has a generous showing in metal trades and in the miscellaneous group of manufactures. Considerable mining and paper milling are also reported.

Oregon reports 621 industrial plants of large dimensions. Lumber and wood products again take the lead, with food products a substantial second. There are 71 metal and machine plants, centering in Portland, 22 mines and 18 textile plants of large size. Leather goods, refrigeration, and paper mills make up the other industries of importance.

Colorado, with 490, stands fourth on the list in the number of plants, with mining, metal trades, grain products, miscellaneous food products, lumber and wood, canning and packing, chemical plants and sugar mills of importance in the order here given.

Utah, with 257 plants listed, devotes its energies to mining, flour milling, lumber mills, miscellaneous food products, metal trades, food canning, textiles, chemical plants and sugar mills. Montana, not far behind, is overwhelmingly a mining district, with lumber milling, grain products, miscellaneous food products and metal trades the only other fields of importance. Idaho features mining, food products, including flour mills and canning, and lumber. Arizona is predominantly mining, with food products a fair second and refrigeration plants and lumber mills next in importance. Nevada reports 39 mines, 7 lumber mills and 17 plants handling food products, including canneries, flour mills and refrigeration plants. Wyoming has 12 mines on the list, 9 flour mills, 11 food products, including 3 sugar plants, 7 oil and natural gas installations, and other minor industries amounting to 58 in all. New Mexico reports lumber mills and wood products plants, 11 flour mills and 7 refrigeration plants, with other activities in small lumber, bringing the total to 48.

Isolated Plants

Figures on isolated plants are of particular interest. Good reports were received from independent plants from California, Colorado and Oregon, and although it is never possible to state that the entire field is covered, it is safe to estimate that practically all of the larger independent plants in these states are represented. Government totals from Utah add this state to those in which compari-

Geographic Distribution of 5221 Western Industrial Plants with a Rating of $50,000 or Over, or Having an Installation of Over 100 Horsepower

Industry	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Wash-ington	Wyoming	Totals
Brick, Cement												
No. listed	4	121	17	7	9	5	3	13	18	39	3	239
No. reporting	.....	46	11	1	.....	1	.....	11	3*	3	1	76
Total H.P.	.....	68,278	3,140	100	.....	480	.....	5,084	7,778*	722	120	85,702
No. on Power Co. lines	.....	45	10	1	.....	1	.....	7	3*	3	1	71
H.P. installed	.....	67,953	2,990	100	.....	480	.....	4,444	7,778*	722	120	84,586
No. isolated	.....	1	1	.....	.....	.....	.....	5	.....	.....	.....	7
H.P. installed	.....	325	150	.....	.....	.....	.....	640	.....	.....	.....	1,115
Canning—Packing												
No. listed	6	199	25	11	3	4	.....	52	21	95	.....	416
No. reporting	.....	25	7	2	.....	.....	.....	18	37*	10	.....	99
Total H.P.	.....	8,667	2,577	315	.....	.....	.....	8,167	4,156*	1,589	.....	25,472
No. on Power Co. lines	.....	22	2	2	.....	.....	.....	14	.....	10	.....	51
H.P. installed	.....	8,287	617	315	.....	.....	.....	2,604	3,411*	1,589	.....	16,824
No. isolated	.....	3	5	.....	.....	.....	.....	14	.....	.....	.....	22
H.P. installed	.....	380	1,960	.....	.....	.....	.....	5,563	745*	.....	.....	8,648
Chemical												
No. listed	.....	194	24	3	.....	.....	.....	.....	12	24	2	259
No. reporting	.....	35	4	.....	.....	.....	.....	.....	8*	.....	.....	47
Total H.P.	.....	34,560	2,235	.....	.....	.....	.....	.....	4,735*	.....	.....	41,530
No. on Power Co. lines	.....	31	4	.....	.....	.....	.....	.....	.....	.....	.....	35
H.P. installed	.....	33,030	2,235	.....	.....	.....	.....	.....	909*	.....	.....	36,174
No. isolated	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
H.P. installed	.....	1,530	.....	.....	.....	.....	.....	.....	3,826*	.....	.....	5,356
Flour & Grain Prod.												
No. listed	7	102	58	47	33	5	4	57	33	59	11	416
No. reporting	.....	27	41	8	.....	.....	.....	29	.....	5	.....	110
Total H.P.	.....	12,294	8,306	1,472	.....	.....	.....	8,809	.....	2,252	.....	33,134
No. on Power Co. lines	.....	22	32	8	.....	.....	.....	25	.....	5	.....	92
H.P. installed	.....	10,577	5,521	1,472	.....	.....	.....	7,059	.....	2,252	.....	26,882
No. isolated	.....	5	9	.....	.....	.....	.....	11	.....	.....	.....	25
H.P. installed	.....	1,717	2,785	.....	.....	.....	.....	1,750	.....	.....	.....	6,252
Food—Miscellaneous												
No. listed	8	233	50	16	22	4	2	42	25	72	8	482
No. reporting	.....	36	8	.....	.....	.....	.....	7	.....	1	.....	52
Total H.P.	.....	14,721	1,875	.....	.....	.....	.....	934	.....	104	.....	17,634
No. on Power Co. lines	.....	23	7	.....	.....	.....	.....	7	.....	1	.....	38
H.P. installed	.....	10,241	1,275	.....	.....	.....	.....	924	.....	104	.....	12,544
No. isolated	.....	13	1	.....	.....	.....	.....	1	.....	.....	.....	15
H.P. installed	.....	4,480	600	.....	.....	.....	.....	10	.....	.....	.....	5,090
Laundry												
No. listed	.....	29	8	.....	.....	.....	.....	8	.....	.....	.....	45
No. reporting	.....	29	8	.....	.....	.....	.....	8	.....	.....	.....	45
Total H.P.	.....	7,101	1,135	.....	.....	.....	.....	1,865	.....	.....	.....	10,100
No. on Power Co. lines	.....	3	4	.....	.....	.....	.....	3	.....	.....	.....	10
H.P. installed	.....	989	610	.....	.....	.....	.....	25	.....	.....	.....	1,624
No. isolated	.....	26	4	.....	.....	.....	.....	8	.....	.....	.....	38
H.P. installed	.....	6,112	525	.....	.....	.....	.....	1,840	.....	.....	.....	8,477
Leather												
No. listed	4	67	11	3	11	.....	.....	15	7	18	4	140
No. reporting	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Total H.P.	.....	.....	236	.....	.....	.....	.....	.....	.....	.....	.....	236
No. on Power Co. lines	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1
H.P. installed	.....	.....	236	.....	.....	.....	.....	.....	.....	.....	.....	236
Lumber—Wood Prod.												
No. listed	13	334	42	44	39	7	25	273	33	367	2	1,179
No. reporting	3	63	6	1	.....	.....	1	266	.....	6	.....	346
Total H.P.	1,500	34,779	780	1,575	.....	.....	140	133,719	.....	7,964	.....	180,457
No. on Power Co. lines	.....	37	2	1	.....	.....	1	88	.....	6	.....	135
H.P. installed	.....	21,477	220	1,575	.....	.....	140	45,149	.....	7,964	.....	76,525
No. isolated	3	26	4	.....	.....	.....	.....	62	.....	.....	.....	95
H.P. installed	1,500	13,302	530	.....	.....	.....	.....	88,570	.....	.....	.....	103,902
Metal & Machinery												
No. listed	8	337	79	11	17	4	1	71	20	112	4	664
No. reporting	.....	70	21	.....	.....	.....	.....	20	16*	6	.....	133
Total H.P.	.....	73,662	13,803	.....	.....	.....	.....	7,914	6,120*	1,977	.....	103,476
No. on Power Co. lines	.....	67	20	.....	.....	.....	.....	20	.....	6	.....	113
H.P. installed	.....	70,792	13,553	.....	.....	.....	.....	7,764	4,532*	1,977	.....	98,618
No. isolated	.....	3	1	.....	.....	.....	.....	3	.....	.....	.....	7
H.P. installed	.....	2,870	250	.....	.....	.....	.....	150	1,588*	.....	.....	4,858
Mining—Milling												
No. listed	30	47	92	8	96	39	2	22	55	35	12	438
No. reporting	3	47	92	8	96	39	.....	22	158*	35	12	512
Total H.P.	11,930	41,201	53,221	10,752	282,207	28,974	.....	9,758	115,586*	12,057	23,200	588,886
No. on Power Co. lines	3	46	69	8	96	39	.....	20	51	35	12	379
H.P. installed	11,930	41,073	45,506	10,752	282,207	28,974	.....	8,967	98,347	12,057	23,200	563,013
No. isolated	.....	1	23	.....	.....	.....	.....	4	.....	.....	.....	28
H.P. installed	.....	128	7,715	.....	.....	.....	.....	2,795	25,720*	.....	.....	36,358
Oil & Gas												
No. listed	1	79	2	.....	4	.....	.....	.....	2	4	7	99
No. reporting	.....	22	2	.....	.....	.....	.....	.....	4*	.....	.....	28
Total H.P.	.....	20,778	4,630	.....	.....	.....	.....	.....	638*	.....	.....	26,056
No. on Power Co. lines	.....	20	2	.....	.....	.....	.....	.....	.....	.....	.....	22
H.P. installed	.....	19,678	4,630	.....	.....	.....	.....	.....	151*	.....	.....	24,459
No. isolated	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
H.P. installed	.....	1,100	.....	.....	.....	.....	.....	.....	467*	.....	.....	1,567

Industry	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming	Totals
Paper—Paper Prod.												
No. listed	1	48	6	1	.....	1	.....	12	4	15	.....	88
No. reporting	.....	6	1	.....	.....	1	.....	5	.....	.....	.....	13
Total H.P.	.....	7,923	300	.....	.....	372	.....	30,661	.....	.....	.....	39,256
No. on Power Co. lines	.....	5	1	.....	.....	1	.....	5	.....	.....	.....	12
H.P. installed	.....	3,923	300	.....	.....	372	.....	10,488	.....	.....	.....	15,083
No. isolated	.....	1	.....	.....	.....	.....	.....	6	.....	.....	.....	7
H.P. installed	.....	4,000	.....	.....	.....	.....	.....	20,173	.....	.....	.....	24,173
Pumping												
No. listed	2	48	.....	6	.....	.....	4	.....	.....	14	.....	74
No. reporting	1	48	.....	6	.....	.....	.....	.....	.....	14	.....	69
Total H.P.	2,000	43,777	.....	10,575	.....	.....	.....	.....	.....	5,852	.....	62,204
No. on Power Co. lines	1	48	.....	6	.....	.....	.....	.....	.....	14	.....	69
H.P. installed	2,000	43,777	.....	10,575	.....	.....	.....	.....	.....	5,852	.....	62,204
Refrigeration												
No. listed	20	70	10	9	5	4	6	14	5	15	1	159
No. reporting	1	46	7	1	.....	1	.....	7	17*	1	.....	81
Total H.P.	127	28,700	2,050	400	.....	122	.....	1,880	2,152*	90	.....	35,521
No. on Power Co. lines	1	37	6	1	.....	1	.....	5	.....	1	.....	52
H.P. installed	127	23,370	1,800	400	.....	122	.....	805	462*	90	.....	27,176
No. isolated	.....	9	1	.....	.....	.....	.....	4	.....	.....	.....	14
H.P. installed	.....	5,330	250	.....	.....	.....	.....	1,075	1,690*	.....	.....	8,345
Sugar												
No. listed	.....	24	23	2	1	.....	.....	.....	9	2	3	64
No. reporting	.....	7	8	1	.....	.....	.....	.....	16*	2	.....	34
Total H.P.	.....	14,626	18,774	450	.....	.....	.....	.....	14,948*	237	.....	49,035
No. on Power Co. lines	.....	5	4	1	.....	.....	.....	.....	.....	2	.....	12
H.P. installed	.....	3,526	4,450	450	.....	.....	.....	.....	3,138*	237	.....	11,801
No. isolated	.....	2	4	.....	.....	.....	.....	.....	.....	.....	.....	6
H.P. installed	.....	11,100	14,324	.....	.....	.....	.....	.....	11,810*	.....	.....	37,234
Textiles												
No. listed	7	142	15	1	1	.....	.....	18	15	26	.....	225
No. reporting	.....	12	.....	.....	.....	.....	.....	5	.....	.....	.....	17
Total H.P.	.....	15,897	.....	.....	.....	.....	.....	1,225	.....	.....	.....	17,122
No. on Power Co. lines	.....	9	.....	.....	.....	.....	.....	4	.....	.....	.....	13
H.P. installed	.....	15,222	.....	.....	.....	.....	.....	355	.....	.....	.....	15,777
No. isolated	.....	3	.....	.....	.....	.....	.....	3	.....	.....	.....	6
H.P. installed	.....	675	.....	.....	.....	.....	.....	870	.....	.....	.....	1,545
Miscellaneous												
No. listed	5	141	25	5	7	3	1	25	.....	21	2	235
No. reporting	4	141	25	1	.....	1	.....	10	.....	10	1	193
Total H.P.	1,810	54,429	24,038	462	.....	151	.....	3,707	39,305*	3,772	400	128,074
No. on Power Co. lines	1	83	21	1	.....	1	.....	9	.....	10	1	127
H.P. installed	250	42,289	7,538	462	.....	151	.....	1,591	.....	3,772	400	56,453
No. isolated	3	58	4	.....	.....	.....	.....	6	.....	.....	.....	71
H.P. installed	1,560	12,140	16,500	.....	.....	.....	.....	2,116	.....	.....	.....	32,316
All Industries												
No. listed	116	2,228	490	163	248	74	48	621	257	918	58	5,221
No. reporting	12	674	245	29	96	43	1	450	259*	93	14	1,916
Total H.P.	17,367	488,336	115,796	26,101	282,207	30,099	140	203,871	195,418*	36,716	23,720	1,419,771
No. on Power Co. lines	6	517	188	29	96	43	1	207	52	93	14	1,246
H.P. installed	14,307	423,146	93,291	26,161	282,207	30,099	140	86,636	118,728*	36,716	23,720	1,135,092
No. isolated	6	157	57	.....	.....	.....	.....	245	.....	.....	.....	465
H.P. installed	3,060	65,189	22,505	.....	.....	.....	.....	114,965	45,846*	.....	.....	251,565

*Figures from R. R. Woolley, U. S. Reclamation Service.

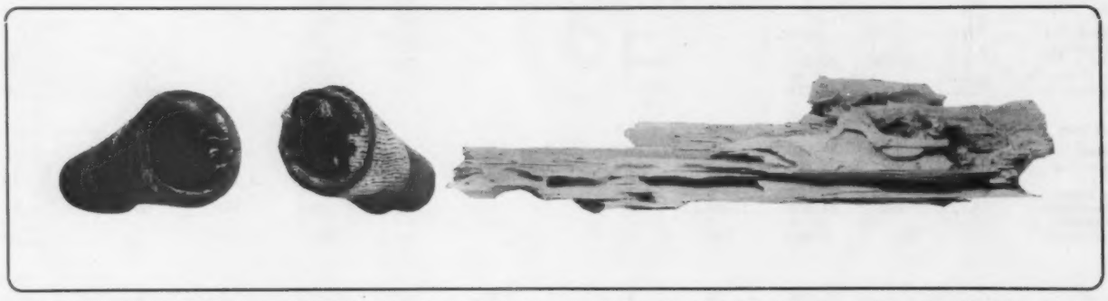
sons may be made. The total hp. reported in isolated plants was 251,560, or 24.6 per cent of the 1,020,668 hp. totals from the states reporting both classes of plant. Lumber mills form the vast majority of the load, 62 being reported from Oregon, 26 from California and 7 from Arizona and Colorado, with a total of 103,902 hp. This is somewhat more than the total in lumber mills reported on power company lines, which comes to 76,525 hp. The plants on the whole are large, averaging 1094 hp., and use the waste products of the mill for fuel.

Second in importance are the sugar mills, also large plants of about 3,500 hp. each, reported from California, Oregon and Utah, with a total of 37,234 hp. Mines come third with 36,358 hp., 23 of them being reported from Colorado, 4 from Oregon and 2 from California. These also are plants of some size, mostly users of water power, although steam plants are reported from several. Buildings, hospitals and other miscellaneous users of power to the number of 71, with an average installation of 455 hp., generate their own power and use 37,234 hp. in all. California reported the largest number of these, the 58 isolated plants of this type constituting the largest group of isolated plants in that state. Paper mills are next, centering in Oregon, with 24,173 hp. between them. These are large plants, averaging 3400 hp., mostly water power, several of them also using power from central station lines.

Of other plants, a large number of canneries use small amounts of steam power, most of them being also served with central station power. Some 38 laundries average about 200 hp. each in small steam plants. In this business power may almost be regarded as a by-product and in consequence this total somewhat exceeds those plants reported using power company service. In the total field of refrigeration, the number of isolated plants is small, but 14 of this group report 8,345 hp. in independent installations. Flour mills to the number of 25 report 6,252 hp., the majority of them from Oregon and Colorado. The remainder of the plants reporting are in the fields of chemical industries, miscellaneous food plants, metal trades, oil refineries, textile mills and cement plants in the order named. Except in the field of lumber and wood products, it may safely be said that the extent of power independently generated is negligible.

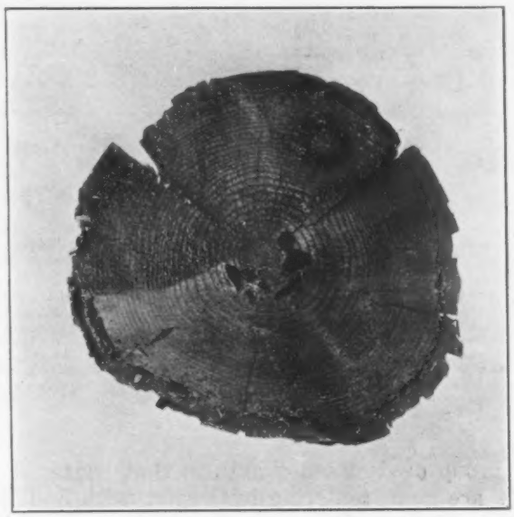
Destruction of Cedar Poles by Termites in California

One of a Pictorial Series Featuring Interesting Applications of Electric Service, Advances in Home, Industrial and Power Construction and Noteworthy Developments in Western Progress



Insulator pin which has been hollowed out by the white ants, or termintes. Boring into the pole below the surface of the ground the ants honeycomb the wood, leaving only a thin shell on the outside. First evidence of the destruction caused by the ants is revealed when the pole is blown down or an attempt is made to move it.

A section of the heartwood of a cedar pole which has been attacked by ants. In some locations in southern California as many as fifty per cent of the poles set prior to 1910 have been attacked by white ants and are in a weakened condition on account of the work of these pests. Creosote treatment is said to prevent attack.



The photograph of a cross-section of a pole shows the characteristic method in which the white ants work.

CEDAR pole users will be interested to know the extent of the damage which is being done to the poles of the Southern California Edison Company throughout that section of the state by white ants. According to R. E. Cunningham, superintendent of distribution, recent investigations which were made disclose the fact that white ants are attacking the untreated cedar poles in large numbers throughout the territory from San Diego county to Santa Barbara and from the coast as far inland as Redlands.

In some locations as many as 50 per cent of the poles set prior to 1910 have been attacked by white ants and are in a weakened condition on account of the work of these pests.

The accompanying photographs by R. J. C. Wood illustrate the ravages and the characteristic method in which these white ants work. Being blind they seem to instinctively shun the light and confine their operations beneath the surface of the pole. From a casual inspection of the outside of the pole, it might appear that the pole was perfectly sound, but rapped upon by a metal bar, the surface will give way and disclose the honeycombed recesses left by the ants.

It seems that the ants come in by subterranean passages and enter the pole in the section below the ground and work up through the pole, both through the interior as well as that portion just below the surface, extending at times even to the top of the pole and eating out the interior of the pins.

Careful investigation has been made of the poles which were treated with creosote by the open tank method, and it now appears that none of these poles, even though they have been set since 1910, show signs of having been attacked by white ants. The presence of creosote in the butt of the pole evidently prevents the white ants from attacking the pole.

The habits of the white ant are such that it is necessary for it to return to the ground frequently for water and it will not travel over the surface of the pole. In an untreated pole the ants keep their run-ways open from the base of the pole upward and when disturbed or when they desire water, can easily return into the ground.

White ant queen in wing state (enlarged). The ants are from three-eighths to one-quarter of an inch long, the queen is about twice as large as the ordinary worker ant.

The white ant worker, shown above in the enlarged photograph, is blind and apparently defenseless, being protected by the soldier ants, from its enemies

Enlarged photograph of a soldier ant. The duty of the soldier seems to be to protect the white ant worker from its enemies the red ants. They are of ferocious disposition.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL
Professor of Sales Management, University of Washington
Educational Director, Northwest Electric Service League

THE SALESMAN HIMSELF—(Cont'd)

In the preceding section of this Study Course we have imagined a salesman calling on you in your office or shop, and have studied the first impressions which he produces on you, and the several factors responsible for these impressions. We followed him as he entered your place, approached you, and then came up to you and exchanged greetings with you. We shall now suppose that you have given him a chance to present his proposition. In doing so he will attempt to influence you in a definite direction—that of buying what he has to sell. He will first give you his basic sales-talk and try to predispose you toward his proposition; then he will go into details, meet your objections, and in general convince you in favor of his goods; and finally he will try to impel you toward definite action—toward the purchase of that which he sells.

Ordinarily the buyer does not meet the salesman during business hours for the purpose of spending a pleasant time with him. The buyer has many other things to attend to besides the salesman. Therefore, he is willing to give the salesman at first only enough time that he may be shown that the proposition presented really deserves further investigation. Hence the first "sales-talk" of the salesman should be so formulated as to arouse the definite and favorable interest of the buyer in the shortest possible time.

Conciseness of Presentation

If a man knows his proposition well and has thoroughly prepared himself to present it to the buyer he can always make his presentation brief but inclusive of all the essentials, and this is what we understand under "conciseness." The salesman who tries to sell without a well thought-out sales-talk, who talks in a rambling way, and talks very long, is—if you look at it from the buyer's angle—not a very honest fellow because he appropriates to himself an undue amount of the buyer's time. We all know that "time is money," but when it comes to the buyer's time the average salesman is too frequently forgetting this fact, with the result that his long-winded talk becomes wearisome and tedious to the buyer. Can we "predispose" a man toward anything by first stealing his time and boring him to death? Lack of preparation as evidenced by absence of conciseness in the salesman's sales-talk is a definite sign of disrespect to the buyer, and is invariably resented by the buyer. Do you offend your customers by long-winded and rambling sales-talks, or do you predispose them towards your proposition from the start by presenting it to them in a concise form? If you were the buyer, how would you rate your own selling talks on that point?

Clearness of Presentation

Clearness of statement consists of presenting all the facts which are pertinent, none which are immaterial, and all in simple, lucid language, and in proper logical sequence. When we do not know our subject we are apt to take recourse to platitudes and generalities. When we are ill-prepared on our subject we are sure to forget some points, to state them haphazardly and not in their proper order, to repeat ourselves unnecessarily, and in general to produce a vague and unsatisfactory impression by our talk. And then again, because our own thoughts on our subject are not clear and definite enough, we run the danger of not conveying them in a clear and definite way to the buyer, particularly in the brief time he is willing to devote to us at first, before his interest is properly aroused. Are all of your statements clear when you make your sales-talk? Are your explanations adjusted to the understanding of your individual customers? Be your own judge, but be frank and sincere with yourself. Put down your score on this point, and increase it if you notice that your customers follow your talk more and more easily as you improve in clearness.

General Competentness

There are really only two classes of sales that can be made even by incompetent salespeople, the universally known branded goods in the class of Ivory Soap and Heinz Pickles, and the goods offered for sale in 5 and 10-cent stores where we have to look out for ourselves and do not expect any "service" at all. Have you asked yourself how the average layman judges the goods he buys in all cases but these two just explained? He looks, usually without being aware of it, upon the salesman as his buying adviser, and the more competent the salesman appears to be, the more ready is the buyer to accept the salesman's judgment and advice in the matter of purchasing. This is similar to our attitude towards a physician. If he gives us the impression of competentness, we believe in him and are willing to be influenced by his advice. If he does not succeed in creating that impression in us, no matter how good and sound his advice, we will not follow it if we can find another doctor to consult.

In other words, it is essential for a salesman not only to be competent, but also to appear competent.

Definiteness of statements, directness of answers, absence of "beating around the bush," and above all, that intimate familiarity with the goods sold, which we will discuss in a separate section of this Study Course. All these tend to create in the buyer a high degree of confidence in the salesman's competentness.

The first sales-talk alone rarely sells. It will hardly ever cover all the points the buyer will want to know. And then there are all the possible objections which the buyer is sure to raise and which have to be "overcome" by argument and otherwise. The favorable interest of the buyer having been aroused the salesman will have to use his convincing influence to convert this into definite desire, and to remove the mental obstacles which keep the buyer from coming to a decision.

Enthusiasm

The salesman who cannot develop a high degree of enthusiasm for his work and especially for the product he is selling will never pass beyond the stage of a mere order-taker. In fact, more failures in salesmanship are to be ascribed to the salesman's indifference and lack of enthusiasm than to most of the other causes. This depends mostly on a wrong point of view. The salesman assumes that he is selling certain things to the buyer, whereas, as a matter of fact, he is doing nothing of the sort. People buy things only for the service or utility they get out of them. We buy coal to enjoy the warmth we get out of it; a piano to enjoy the music it can be made to produce; we buy eggs to eat them, and coffee to drink, and to enjoy the satisfaction we get from doing this. With the exception possibly of some fake patent medicines there is practically nothing made or produced commercially which does not give to its user a definite satisfaction and render him a definite service. Give free reins to your imagination! Conjure up in your mind in connection with everything which you are selling a picture of the buyer enjoying its use and getting a lot of satisfaction out of it, and you cannot fail to develop a healthy enthusiasm in the thing you sell, because it renders a good and valuable service to the buyer, and in your own work as a salesman, because you help every customer of yours to get so much more satisfaction out of life. Get this "service" point of view, and you cannot escape becoming an incurable enthusiast.

Truthfulness

Never under any conditions make any mis-statements about your goods or anything directly connected with your business. Once in a very long while you may get away with an untruth. But ordinarily mis-statements made by salesmen carry a kick-back which may be compared with the kick of a mule. If you cannot keep from bluffing, join a poker club, you will lose much less than if you will try to satisfy your craving for bluff during the selling process. Have you checked yourself up on this point while reading about it? You do not have to show your self-rating score to anybody—so put your grade down, and revise it later if it is less than 100.

How can you hope to convince me of anything if you are not fully prepared to answer all the questions I may choose to ask? Your answers must be "snappy" and satisfactory, or else I will not trust your "advice." Of course, this ability comes only with experience. So you had better list every question and objection related to the specific thing you sell, and study them over. Put down the proper answer, and learn it. Are you preparing yourself systematically for possible questions and objections, or do you simply trust to your ingenuity and luck?

There are really only three characteristics which will help you to impel action on the part of the buyer if you have succeeded in arousing his desire. They are the ones which every salesman must develop in himself unless he wants to break down in the "closing" of many of his sales.

Persistency

In many dictionaries you will find "persistency" explained as "obstinacy," the reason for this being that it would be too slangy for a dignified dictionary to define it as "stick-to-it-iveness." Do not pester your client, but "stick to it." Somehow, most people are so constructed that they dislike to make a decision but prefer to put it off. This is usually due to their desire not being aroused strongly enough. And it is up to the salesman to realize this, and to persistently stimulate the imagination of the buyer until the decision is made and the sale closed. Are you game enough to redouble your selling efforts when you seem to have lost the sale, or are you readily discouraged? Are you yourself really sufficiently sold on your goods to be able to sell them to others, or do you just "make a stab" at selling?

Assuredness and Diplomacy

We all are apt to follow "leaders" because they seem to know what to do. Similarly, in the process of selling, the salesman who exhibits a proper amount of assuredness in leading the buyer to the "close" of the sale will have more success than the one who hesitates and wavers. This "leadership" through assuredness should not be confounded with "cocksureness" by the salesman. Assuredness is based on competence and enthusiasm, and it is so infectious because it cannot be faked. If you like your work and your goods, and if you know your business well, it is one of the easiest things to show the quality of assuredness. What is your present estimate of yourself on this point? Observe yourself in action, and just the fact that you are observing yourself on this count will help you in acquiring greater and greater assuredness, and assist you in closing your sales more frequently.

Diplomacy, as practiced by the salesman, is to be understood as opposed to bluntness. It consists substantially in the ability of the salesman to apply his superior knowledge of the buyer's psychology without disclosing this to the buyer. Diplomacy is never trickery. To be successful in selling we must observe the individual characater of each buyer, and use this and our training in salesmanship to the purpose of overcoming that natural resistance to arriving at definite decisions of which we have spoken.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production. Ideas and Suggestions by Practical Men.

Ship Fuel Bill Decreased by Central Station Power

During the last few years there has been an increasing amount and variety of load taken on by central stations which formerly secured power from their own plants. It is rather unusual even in this day, however, for a public utility to supply war ships with electricity.

San Diego, the home port of the Pacific destroyer fleet, usually has from 30 to 60 destroyers in the harbor. These are grouped in nests, and tied along a wharf, as shown in the accompanying illustration, which was photographed from an airplane.

It was found to be very wasteful for each ship to keep its own plant in operation to supply lighting and steam for heating and cooking, etc., and moreover the personnel on some of the boats was reduced to such an extent that there were scarcely enough men left to properly operate and maintain the ship equipment. The drastic reduction in the amount of money appropriated for fuel supply makes it necessary that every opportunity be taken advantage of to economize by efficient operation. With this end in view, a contract was entered into with the San Diego Consolidated Gas & Electric Company to supply lighting service at various points along the wharf. Each "nest" of ships "plugs" in at this point to secure lighting and either one of the ships in the group operates its boilers, or else a steam line is connected from the wharf to supply heating requirements.

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

The connected load of a destroyer averages about 4 kw. of lighting and 15 hp. in power. The motors which are of the direct current type, are not ordinarily operated when the ship is in port. The ship's plant consists of two 25-kw. turbine driven d.c. generators.

The blacksmith and machine shops, as well as the battery charging plant, which handles the work connected with the fleet, are located on the wharf. These are served by two motor generator sets of 90 kw. aggregate capacity. There is a total connected load of over 100 horsepower in motors in the shops. The battery charging load is heavy as there are a great number used on the destroyers. There have been as many as 750 batteries floating on the line at one time, although the average load is about 300 batteries.

This unique load has a very good load factor, the power and battery charging keeping the demand steady throughout the day. The consumption is about 100,000 kw-hr. per month.

Although the government is undoubtedly making a neat saving by using central station service for these ships, it is rather difficult to estimate just what this economy would amount to.

P. P. PINE,
Sales Engineer, Commercial Dept.
San Diego Consolidated Gas & Electric Company.

Remarkable economies in fuel are effected at the Pacific destroyer squadron base at San Diego by connecting the vessels with the central station lines while they are in port, thus eliminating the use of their boilers to supply power.

Utilization of Natural Gas in Making Carbon Black

Millions of cubic feet of natural gas, one of the chief co-products of the oil fields of California, Montana and Wyoming, are being lost each year owing to the fact that the commodity cannot be used as a fuel as rapidly as it is produced. Recent figures show that the supply of natural gas below the surface of the earth in the states where it has been most plentiful is decreasing at an alarming rate.

Likewise the demand for carbon black which is produced from natural gas is increasing more rapidly than this element is being made. Many proposals have been made regarding the utilization of the natural gas supply in California yet no attempts have been made to manufacture carbon black, but the gas has been allowed to go to waste.

Doubtless if the facts concerning the use of this element in many of the most important manufacturing processes is set forth, together with figures concerning its production, there might be some attempt to turn the gas into carbon black in California.

To illustrate the uses of this product, it might be said that carbon black has been used as a pigment in printer's ink instead of lampblack since 1864. More recently it has become one of the chief substances used for coloring and reinforcing rubber and as a pigment in paint. Stove and shoe polish, black leather, phonograph records, buttons, carbon paper, celluloid, electrical insulators, cement, coloring ink and many other important American products are dependent upon carbon black at some stage of their manufacture.

These data have been set forth because during recent months there has been considerable discussion regarding the utilization of natural gas in California, which at the present time constitutes an enormous waste.

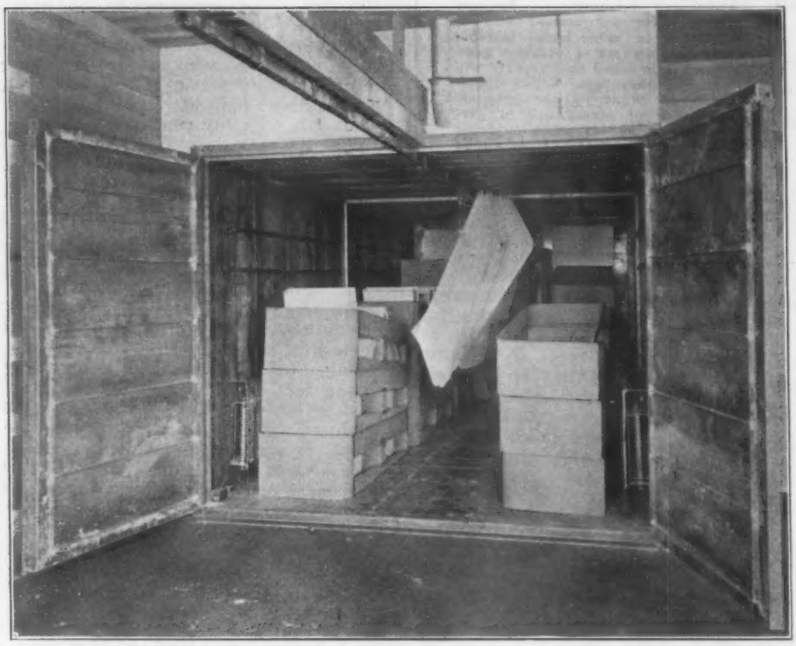
L. K. BLAKE.
Bakersfield, Cal.

Electric Oven Shows Economies in S. F. Factory

New Features of Automatic Enameling Oven Permit 100 Per Cent Labor Saving in Plant of Forderer Cornice Works

The cleanliness of electricity as a fuel is a recognized virtue. An even greater advantage of electricity over fuels in general, is the reliability of service and its unvarying heat at definite adjustments; together with the simple means of controlling the temperature, as well as the duration of the cycle.

The Forderer Cornice Works of San Francisco, manufacturers of hollow steel doors, interior trims, steel partitions and hollow steel window frames and sashes, have recently installed a kiln-type enameling oven, built along the most modern engineering lines. The



The automatic electric enameling oven in the Forderer Cornice Works, San Francisco, showing a full load of metal furniture ready for baking. New features permit this work to be done during the night so that when the workmen return to the plant, the oven is ready for another load.

interior dimensions of the oven are 8 ft. high, 10 ft. wide and 22 ft. long. Provision is made for the insertion of a heat-insulated barrier spanning the center of the oven, thermally insulating each end. The walls, doors and top are double wall construction and filled with three inches of powdered heat insulating material. The floor is three-eighths inch steel plate, resting on two inches of heat insulating brick. There is no through metal between the inner and outer surfaces of the walls, top or doors, except at the junctions at each end of the oven.

The electrical equipment is arranged to give individual operation to either or both ends of the oven with the heat insulated barrier in place; or, operation in unison, of both ends, with the heat insulated barrier removed. Each end of the oven is controlled by its own bank of heaters with power control panel, electric control thermostat system of ventilation consisting of motor-driven exhauster, door switch and push button station. A time clock is connected for time or cycle control of either or both ends of the oven independently, or both ends in unison.

The heaters are of the open ribbon construction type, wound on fire clay bushings, assembled on steel tie rods, the whole supported by pressed steel end plates. The construction of these heaters permits their suspension from flanges on the heater end frame, allowing ready expansion and contraction of all parts of the heater as well as affording a simple means of mounting. Each heater has a capacity of 2.3 kilowatts, there being 32 heaters installed, having a combined capacity of 73.6 kilowatts. The power for the heaters is controlled by a three-pole magnet switch or contactor.

The ventilating system is so designed that the ends, the corners and the center of the oven, all receive the same degree of ventilation. Cold air enters through the top of the oven, the exhaust air being taken three-fourths from the bottom and one-fourth from the top. The motor for the exhauster is controlled by two single pole relays. The control circuit for the automatic panel is connected on the motor side of the two relays mentioned above, in such a way that the motor driven exhauster is always operating when the control circuit is energized. A thermostat, push button station and door switch are so connected in the control circuit, that the following cycle of operation can be obtained:

With the oven cold at the start, the thermostat will make contact on the low position. The door switch and push button are closed, the control circuit being completed through the low contact of the thermostat, energizing the control relay, which in turn closes the three-pole magnet switch, or main contactor furnishing power to the heaters. As the oven temperature rises, the thermostat will leave its low position, the three-pole magnet switch, controlling the oven heaters being held in place by a mechanical interlock on the control relay. The thermostat on reaching the high position, short circuits the control relay, de-energizing the three-pole magnet switch, thereby cutting off the power from the oven heaters. The oven, on again reaching its low or minimum temperature, repeats this cycle.

It was found necessary and beneficial to have the duration of the bake under automatic time control. The control circuits of both ovens have been so connected with reference to this time switch, that the operator may put under time control either one or both ends of the oven simultaneously with insulated heat barrier in position; or both ends operated in unison with heat barrier removed. This scheme of operation permits the workmen to fill the ovens ready for a bake before closing the shop, the time clock starting and stopping the bake during the night or early morning, the material being thoroughly baked and ready to be taken from the oven, when the workmen arrive the next morning. Putting through a bake between closing time of one day and opening time the next morning is a 100 per cent saving of labor during the cycle of that particular bake. Another labor saver is the electric control thermostat or, in this particular case, thermostats which keep the temperature of the ovens at predetermined value.

Determining the proper baking temperature and duration of bake for every color and type of enamel used in their process has enabled the Forderer Cornice Works, with the aid of perfect temperature and time control, to turn out uniformly finished material. "Spoilage" is unknown to this concern.

That the characteristic of this installation may be fully understood, the following operating conditions are given:

Automatic time, temperature and ventilation control.

Power service, 220-volt, two-phase, 60-cycle.

Connected capacity, 73.6 kw.

Initial temperature, 50 degrees F.

Final temperature, 200 degrees F.

A bake of 4000 pounds consisting chiefly of hollow steel doors, was placed in the oven with heat insulating barrier removed. The results of this particular bake were as follows:

Load 4000 pounds, hollow steel doors.

Room temperature, 47 degrees F.

Temperature of oven at end of bake, 200 degrees F.

Time required to reach maximum temperature, 35 minutes.

Time oven was held at constant temperature (200 degrees F.), 3 hours.

Kva. $= (V \times I) \div 1000 = 70.2$ kw.

Actual kw. (watt-hour meter) $=$ 69.82 kw.

Power factor of heaters $= 98.5\%$.

Power consumed for entire bake $=$ 100 kw-hr. for 4000 pounds metal baked.

Power consumption per pound of metal baked, 0.025 kw-hr.

Pounds of metal per kw-hr. $= 40$.

ELBERT KRAMER,
Industrial Heating Specialist.
Westinghouse Electric & Mfg. Co.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Waffle Eating Contest Features Denver Window Display

Westinghouse electric waffle irons were given a supreme test during the Electrical Week recently held in Denver under the auspices of the Electrical Co-operative League.

As one of the features held daily in the downtown dealers' stores, a waffle eating contest was staged between three negro boys from one of Denver's settlement missions, in the windows of the Denver Gas and Electric Light Company.

Tom Yonley of the Mine and Smelter Supply Company, Westinghouse distributors in the Rocky Mountain territory, lost track of the waffle consumption after one of the boys had eaten thirty-five of the crisp cakes swimming in butter and syrup. Assisting in putting on the display was M. E. Lanning of the Westinghouse Company and R. G. Gentry, assistant commercial manager of the Denver Gas and Electric Light Company. Miss May E. Butterfield, a Westinghouse demonstrator, operated the waffle irons during the contest.

According to Clyde H. Osborn, advertising manager of the Mine and Smelter Supply Company, who originated the contest, the window demonstration, because of its novelty and human appeal, proved an excellent advertising medium, judging from the sales which were made and the inquiries received after staging the contest.

The waffle eating contest was only one of a number of novel methods used to stimulate interest in electrical appliances during Electric Week.

During Electrical Week in Denver recently a waffle eating contest was staged in the window of the Denver Gas and Electric Light Company which materially increased sales of this type of electric appliance.

Convenience Outlet Installation Costs Compared

California Cooperative Campaign Prepares Charts Showing Wiring Data for Five-Room Cottage and Apartment

In an effort to further stimulate interest among the contractors regarding the installation of convenience outlets in homes and apartments, the contracts for which they might secure, the California Electrical Co-operative Campaign, through its convenience outlet committee, has prepared two sets of charts showing the comparative costs of wiring jobs for these types of dwellings.

The charts constitute an accurate listing of all material which might be used in wiring a five-room apartment or five-room cottage when no convenience outlets were installed, together with a listing of the additional material required when two convenience outlets are installed. Price comparisions in percentages are also made for each job.

The following list shows the material used in a five-room apartment with no convenience outlets, together with the service material:

7—½-in. Conduit Boxes (Round).
7—½-in. Conduit Boxes Covers.
7—½-in. Fixture Studs.
7—½-in. Conduit Boxes (Square).
7—½-in. Conduit Boxes Switch Covers.
7—S. P. Push Button Switches.
5—1-Gang O. B. Plates.
2—1-Gang N. P. Plates.
1—30 Amp. D. P. Ext. Oper. Switch.
2—10 Amp. Fuse Plugs.
240 Feet ½-in. Galv. Conduit.
500 Feet No. 14 D. B. R. C. Wire.
56—½-in. Locknuts.
28—½-in. Bushings.

Service

30 Feet ¾-in. Conduit.
100 Feet No. 10 S. B. Solid R. C. Wire.
1—¾-in. Type E Taplet.
1—30 Amp. T. D. Ext. Oper. Switch.
3—30 Amp. Fuse Plugs.

The additional material for two convenience outlets follows:

2—½-in. Rd. Conduit Boxes.
2—½-in. Rd. Conduit Boxes Covers.
2 Convenience Outlets.
2 Convenience Outlets, Plates.
2 Convenience Ooutlets, Plugs.
8—½-in. Locknuts.
4—½-in. Bushings.
36 Feet ½-in. Galv. Conduit.
80 Feet No. 14 D. B. R. C. Wire.
1—30 D. P. Service Box.
2 No. 1935 Plug Cutouts.
100 Feet No. 12 S. B. Sol. R. C. Wire. Service.

Cost figures show that the installation of but two convenience outlets means but the small increase of 22 per cent in the value of the electrical material installed.

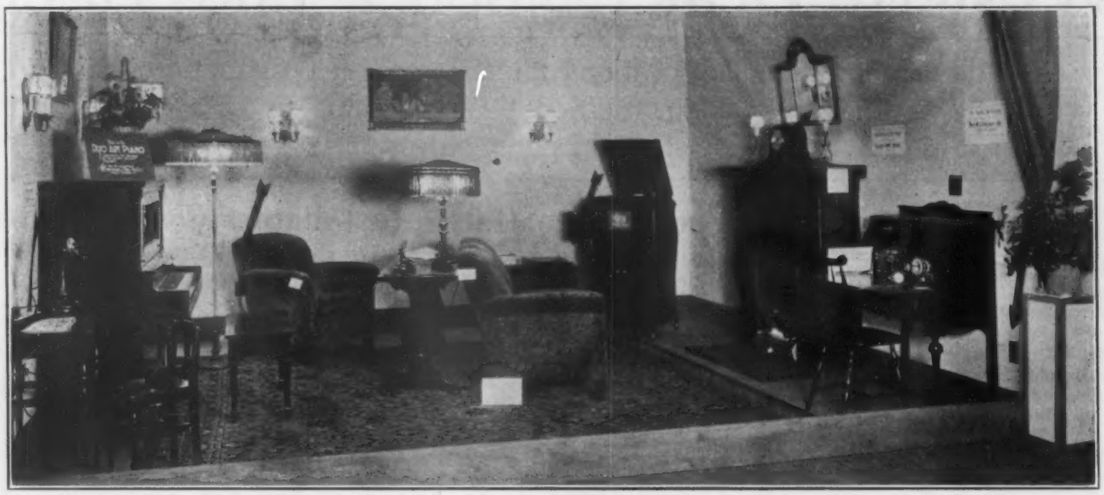
For a five-room cottage or bungalow, with no convenience outlets, it is estimated that the following would be required:

9 Ceiling Outlet Boxes.
7—1-Gang Switch Boxes.
1—2-Gang Switch Boxes.
40 Loom Clamps.
450 Feet No. 14 D. B. R. C. Wire.
22 Feet ½-in. Galv. Conduit.
50 Feet No. 12 S. B. Solid R. C. Wire.
1 Type E. ½-in. Taplet and Cover.
1—30 Amp. D. P. Service Switch Ex. Oper.
2—10 Amp. Plug Fuses.
300—3x5/16 Porc. Tubes.
80—5½-in. 10c Nailet Kobs.
50 Feet 1/32-in. Flextube.
9—½-in. Fixture Studs.
9—S. P. Push Button Switches.
4—1-Gang O. B. Plates.
3—1-Gang H. P. Pdates.
1—2-Gang O. B. Plates.

The additional material necessary for the installation of two convenience outlets would be:

2—1-Gang Boxes.
2 Convenience Outlets.
2 Convenience Outlet Plates.
2 Convenience Outlet Plugs.
8 Feet 7/32-in. Flextube.
100 Feet No. 14 S. B. Solid R. C. Wire.
80—3x5/16-in. Porc. Tubes.
8—5½-in. Nailet Knobs.
1—30 Amp. D. B. Service Box.
2 No. 1935 Plug Cutouts.
4—10 Amp. Plug Fuses.
8 Loom Clamps.

In this case the value of the material for the two outlets would increase the cost of the job approximately 27 per cent.



The living room in the model electrical home at the Spokane Electric Show with its many conveniences. One of the features of this room was a small radio set. Note the arrows pointing to the convenience outlets.

The dining room demonstrated the simplicity and beauty of a room equipped with electrical appliances. Even the lighting fixtures were carefully chosen. Particular stress was laid on a portable quadruple plug for use with the table appliances.

Home Electrical at Spokane Show Proves to be of Practical Value to Industry

Four Room Model Display Attracts as Many Visitors During Week of Exposition as Actual Home in Residence Tract, Dealers Say

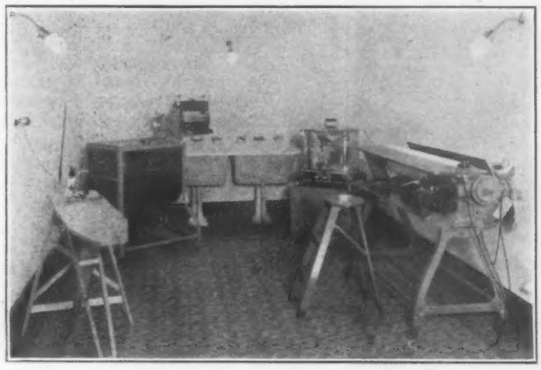
SPONSORED by the Northwest Electrical Service League, the Spokane Electric Show, held in Spokane, Wash., recently, claimed the cooperation of every member of the electrical industry in that community. Its success is measured from three different angles: first, the large attendance of substantial citizens directly stimulated sales even though the exposition was solely educational; second, the community was awakened to the importance of the electrical industry; and third, the entire electrical industry was united in a common purpose.

There were no booths for individual firms. Instead the exhibits were arranged in classes of equipment so as to afford a comprehensive display of electrical servants in compact units. Demonstrations of each type of appliance were given at all times during the day.

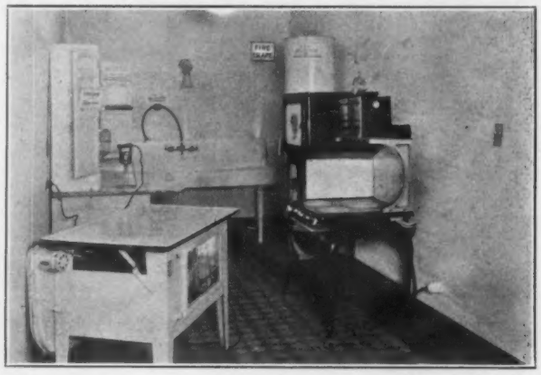
The home electrical proved to be the most interesting and educational exhibit of the show. It consisted of four model rooms, furnished with practically all of the appliances used today and arranged like a series of display windows. In the living room there was a compact radio set, electric piano and phonograph, fire-log and floor and table lamps. The dining room emphasized the use of table appliances and a portable quadruple floor plug. In the kitchen, range, water heater, food mixers and a dish washer were exhibited. The laundry drew the attention of the largest number of women visitors.

Sales of electrical goods increased appreciably following the show, according to reports from dealers. In many instances dealers stated people came directly from the exhibits to the store to purchase some appliance they had just seen demonstrated.

The members of the industry were not content to merely hold an electric show, but immediately following its conclusion they held a meeting to discuss methods of reaping the good-will created during the week if exhibits. Sales campaigns were instituted and other methods of carrying the message of the electrical servant to the general public were discussed.



The laundry was the center of attraction for the feminine visitors at the show. With its mangle, washer, hot-plate and conveniently located lights, it ably demonstrated the electrical servant idea.



The kitchen was arranged to show the housewife the number of steps that might be saved and benefits to be derived from electrical appliances. The glass door in the dishwasher aided demonstrations.

The Contractor-Dealer and His Advertising Plan

The Elements of Good Advertising and How They May Be Applied to This Branch of the Electrical Industry

By W. D. MORIARTY
Field Representative, Northwest Electrical Service League

In small towns and in large cities the average merchant thinks he is very much better known than he is. He can never, seemingly, get it through his head that people pass by his store day after day and never find out it is there. In a town of less than five thousand I have stopped on a corner and asked a group of very evident "natives" the location of the oldest contractor-dealer's store in the town without getting the desired information.

There are two classes of new customers who may come to your store as a result of advertising, newcomers who naturally judge stores by the advertising they do, and older residents who have been trading elsewhere and are not especially attached to the store where they have been accustomed to go. For this latter class it takes real advertising to get them to take the trouble to look you up. And it takes persistent advertising. They must have a reason for changing a habit. Of course many, very many, are of the wandering type or of the shopping type and drift from store to store, but three-fourths of the people with steady incomes tend to develop steady places to do their trading, and to sell one of these the idea that your store is a good place to trade is worth pleasing three or four drifters.

Advertising to Hold Old Customers

Does anyone imagine that Swift's Premium Ham is advertised primarily to secure new customers? Far from it. Of course that is one of the reasons, but it is not the chief reason. The chief reason why any well established article or store makes continued and increasing use of advertising is to maintain its position of supremacy. Keep your old customers sold and they will help you gain new ones. Quite true. But your old customers like to see your advertisements, like to feel they are in touch with you at other times than when they come into the store.

Suppose your competitor advertises and you do not, what are your chances of maintaining ascendency in the minds of your customers? At least you are handicapped. And remember that your chief competitors do advertise. Even if all the contractor-dealers in the town agree to do no advertising, their chief competitors are still hard at it telling every subscriber to a newspaper and every reader of a billboard why they should spend their money with THEM.

Advertising in Your Windows

The least a man can do, the very least he can do and still maintain his self-respect as a merchandiser, is to pay some attention to his windows. The jeweler and the pawnbroker, the clothing store and the shoe store, and above all the department store, advertise to the passer-by the best reasons they can think of which will make him patronize them. And with the aids furnished him the contractor-dealer has little excuse for not meeting this window competition on its own grounds.

To be sure, taste is a powerful factor in highly effective window dressing. The electrical dealer cannot hope to secure with no expense the highly effective windows of a department store which goes to great expense in dressing its windows and has a specialist in this field. No sane dealer, however, will pretend that if he is willing to use the helps sent him and bring to the task whatever ability he has, he cannot at least produce a thoroughly respectable window, one that will suggest that the store has someone who knows his business and takes enough pride in it to care for appearances.

Rules for Window Dressing

These rules are not given as iron-clad rules which must never be violated. It will be well, however, for the man not skilled in the art to keep them well in mind. They will save him time, and they will keep him from putting in windows which look all right to him but which will be less effective than he might otherwise secure.

Rule 1. In the show windows, show cases, and wall cases, things should be grouped in twos and threes, seldom in fours, and never in fives or sixes. Things may be grouped in two sets of threes or three sets of threes, but not in four sets of threes. A row of six or eight irons, for instance, must be broken into groups.

Rule 2. Put no article behind a partition bar, either in window, show case or wall case. If your show case has an upright bar down the front of it or across its top, put nothing in such a position that this bar will bisect it when the customer is directly in front or above it.

Rule 3. In so far as is possible arrange your displays in rectangles which are .6 as wide as they are long. If the depth of your window is three feet and its width ten feet, it naturally falls into 3 x 5 spaces, and if it is all used for one unified display you need to do an especially good job of arranging things. This rule has its value in calling attention to difficulties which the shape of windows impose almost necessarily, and to the fact that better results are often secured by breaking a window up than by using the whole window for one display. For instance, a 3 x 12 window might better have even three divisions than only one if the articles are small, for the sheer weight of numbers would be apt to produce a hodge podge effect no matter how regularly they were placed.

Cut Price Advertisements

Much bad advertising has been done by the advertising departments of manufacturers and passed on by them to retailers. The least cut in price which is really effective in motivitating purchases is 20%. This is pretty generally understood by experts in advertising. A ten per cent cut is so small that it really makes little difference except as a confession that the previous price was too high. Moreover, the margin of profit in this field is so small that a ten per cnt cut which the dealer himself might make, that is without corresponding reduction in his purchase price, would more than wipe out all his profit.

Department stores and other stores carrying stocks of many kinds may advertise marked price reductions on one type of goods and make good their loss by the sale of other kinds. The electrical dealer, however, has neither the volume nor variety of business to justify so drastic a cut in price to produce marked increase in sales.

There is, moreover, another reason for avoiding stressing price reductions. Reductions in other fields have been much greater and any normal reductions in this field in minor appliances will seem petty in comparison, will seem like still holding the price up. In washing machines, even, the price reductions do not come all at once, and the heart of cut-price advertising is announcing the last drop in price, not some total drop.

Finally, the specialty man who has any real claim to consideration as an expert wants to get away from advertising and selling on a price basis. The sooner he gets to a quality basis the better. Compared to the service which money spent for electrical appliances brings, the service secured by money spent for other things will not show to advantage. And men should advertise the STRONG points of their business, in this case of service, not points such as price reduction in which they are excelled in other fields.

Advertising by Inside Display

Keeping unsightly things out of place and giving prominence to attractive things is one of the first principles of effective merchandising. Arranging these attractive things to add to the attractiveness of each other is equally important. Mere desire to arrange his store with these two things in mind will not suffice, but no one who works steadily on the job will fail to secure results which are a decided improvement on the best results he can hope to secure if he does not work steadily on the job.

Just the evident desire to please is a powerful factor in bringing people into your store. Place things with the idea of attracting the attention of customers and just a few simple rules of display will enable you to make your store at least presentable.

EDITOR'S NOTE

This is the third of a series of articles on this subject by Mr. Moriarty. The final article will appear in an early issue of the Journal of Electricity and Western Industry.

Dealers should use caution in displaying electric heaters in doorways adjacent to window displays where the range in temperature is great. The coefficient of expansion of the glass is such that the portion of the window nearest the heater expands to such an extent that the entire window is liable to crack. Similarly in cold weather, when the heater is turned off the sudden cooling of the glass is liable to cause a break.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Northwest Plant Progressing

Spokane River Project of Washington Water Power Co. Nears Completion

The Washington Water Power Company expects to complete its project for the development of 14,250 horsepower from the upper falls of the Spokane river in Spokane early in February at a cost of somewhat over $1,000,000. The work was started a year ago this January. The company now has 90 men at work and during the summer months had from 250 to 300.

The upper dam by which water will be diverted into the south channel of the river to flow to the penstock has been completed and the gates are being installed. In the power house, the water wheel has been installed and the generator is being assembled. When this is completed, the water will be turned on for a series of tests to occupy the early part of February.

All of the machinery of the power station will be controlled from the Post street sub-station of the company, nearly two blocks distant. With the completion of this plant, the company will have a total of 136,250 horsepower available from its five plants, divided as follows: Long Lake 67,500 hp., Post Falls 15,000 hp., Little Falls 27,500 hp., Upper Falls 14,250 hp., Monroe street 12,000 hp.

New York Company Will Insure Electrical Machinery

Electrical machinery may now be insured as the result of an announcement made by the Travelers Indemnity Insurance Company of New York City. The company has announced that it is ready to issue policies to "indemnify the assured against loss or damage sustained by him on account of mechanical breakdown and electrical burn-out of the insured machines, accidentally caused." The general coverage is similar to that afforded under steam boiler and engine policies. For motors and generators the company requires for rate quotation the character of the current, the voltage, the capacity and the speed in r.p.m. For transformers the number of phases, the primary and secondary voltages and the capacity are required.

Men Start Work in Butte Mines After Months of Inactivity

With a total of 2000 men put to work in the mines in and around Butte, Montana, since these properties resumed activities on January 16, the effects of the financial depression in this district are believed to have worn off. Conservative estimates place the number of men now at work in the mines at approximately 5000.

New Fields for Illumination

Yosemite Valley is proving to be not only one of the great summer playgrounds in California but also for winter sports. Hundreds of visitors are enjoying its snowclad environs this winter. The sports are not confined to daytime alone for the toboggan course has been flood lighted in an effective manner.

The Anaconda Company has opened the Mountain View, Leonard, Badger State and Steward mines, while the Butte and Superior and Clark mines are on a one-shift basis.

In some of the mines repairs are being made at the present time and officials state that all of the big producers will be working shortly after the first of February. The Davis Daly mine is being completely electrified and electric ore trains will operate in place of the gasoline ones which were used preliminary to the shutdown nine months ago.

A total of six hundred men have been put to work at the smelter at Anaconda and trains have been bringing in quantities of ore from Butte for over a week.

Reclamation of 35,000 acres and ultimately of 15,000 acres additional in central Oregon will be undertaken immediately by Samuel Hill, former railroad and telephone operator, and a group of Oregon and Washington capitalists, operating as the North Canal Company, according to announcement to this effect made by Oswald West, attorney for the company. A reservoir of 160,000 acre-feet capacity, canals, etc., will be constructed in connection with the undertaking, which will cost in excess of $1,000,000. A contract with the state obligates the company to sell the lands at $75 per acre with water rights.

Shipping Combine Approved

Committee to Meet with U. S. Shipping Board Is Appointed

Negotiations with the United States Shipping Board over the purchase and allotment of the vessels which will make up the fleet to be operated by the $30,000,000 shipping combine which has been proposed for the Pacific Coast will open early in February as the result of the meeting between representatives of the principal parts of this section held in San Francisco recently.

The plan met with the unanimous approval of the delegates to the sessions, and according to shipping men marks one of the most forward steps which have been taken in recent years to stabilize trade out of Pacific Coast ports.

The personnel of the committee which will handle the negotiations with the Shipping Board follows:

Herbert Fleishhacker, president of Anglo and London-Paris National bank, San Francisco, and vice-president of the Great Western Power Company.

Captain Robert Dollar, president Robert Dollar Company, shipping, San Francisco.

Kenneth R. Kingsbury, president Standard Oil Company of California, San Francisco.

Paul Shoup, president Pacific Oil Company and Associated Oil Company, San Francisco.

Harrison S. Robinson, attorney, Oakland.

William Piggott, vice-president Pacific Coast Steel Company, Seattle.

J. C. Ainsworth, president United States National Bank, Portland.

William Jones, capitalist, or **John S. Baker,** capitalist, Tacoma.

John D. Fredericks, president Chamber of Commerce, Los Angeles.

John D. Spreckels, capitalist, San Diego.

New Hydroelectric Development On Colorado Revealed

The copper interests of Arizona are credited as backing a $30,000,000 hydroelectric project on Diamond Creek, a tributary of the Colorado River, according to an announcement made in southern California recently by R. U. Fitting, treasurer of the Parklap Construction Company of New York. The project is said to call for the generation of 600,000 horsepower, 150,000 horsepower of which is to be used by the copper interests and a portion of the remainder by the Santa Fe Railroad for the electrification of its lines from Winslow to Barstow, in accordance with plans which have been drawn up by the engineering interests which Mr. Fitting represents.

According to Mr. Fitting, the Diamond Creek dam would be 400 feet high and 1200 feet long at the top. He states that it would in no way interfere with the Boulder Canyon project which is being considered at this time by the Colorado River Commission in Washington, D. C.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by Paul Wooton, Special Correspondent of the Journal of Electricity and Western Industry

Every effort is being made by the Federal Power Commission to expedite issue of a license to the El Dorado Power Comany so that it may start construction on its Upper American River project. The company, which is a subsidiary of the Western States Gas and Electric Company, advised the Commission recently that it is prepared to start construction immediately, and for that reason it is very anxious to secure a license at the earliest moment. The capacity of the project is 20,000 hp.

Muscle Shoals

After further conferences with Henry Ford, the Secretary of War has announced that he will submit the modified offer of Mr. Ford for the Muscle Shoals project to Congress in the very near future. Mr. Ford modified his original offer to the extent that he will agree to construct and complete dams No. 1 and 2, and will pay the Government as an annual rental of the property an amount equal to four per cent of the total cost of such construction.

The Construction Company of North America of San Francisco and the Newport Shipbuilding Company of Wilmington, N. C., are to submit more comprehensive offers for the property than those now on file. These offers will be submitted to Congress along with the Ford offer. A spectacular clash in Congress over the whole proposition is in prospect.

Patent Office Relief

By a vote of 305 to 44 the House of Representatives on January 12 passed the Patent Office relief bill. Due to the low salary scale in effect at the Patent Office, there has been a very heavy turnover among its technical personnel. This has had the effect of delaying the work until 60,000 applications have banked up and are awaiting action. The effect on industry has been nation-wide and the demand for the legislation has been unusually widespread. The bill was opposed by House leaders on the ground that it establishes a precedent which sooner or later will have to be applied to 300,000 other employes of the Government. It was declared that the state of the public treasury is not such as to permit salary increases which in some cases amount to 50 per cent. Despite the influential character of the opposition, the bill was passed overwhelmingly. The Senate is preparing to take prompt action on the measure.

The Federal Power Commission has expressed its willingness to act on a valuation by the California Railroad Commission on the Kerckhoff plant of the San Joaquin Light and Power Company. The project is in operation, but the issue of a license has been delayed awaiting valuation.

An application for preliminary permit covering the important Grande Coulee waterpower on the Columbia river in the state of Washington has been filed with the Federal Power Commission by Col. Hugh L. Cooper of 101 Park avenue, New York. It is estimated that this project justifies the installation of 1,000,000 hp. An exhaustive report on this project was made by the State of Washington in its Columbia Basin report.

The whole subject of proposed revisions of the mining laws, which have remained practically unchanged since 1873, is to be taken up early in February at public hearings to be conducted by the Committee on Mines and Mining of the House of Representatives. Since there is widespread opposition to many of the suggested changes in the law, it is believed likely that the committee will decide, after the matter has been threshed out, to recommend the repeal of the Apex law insofar as it applies to future claims. There is no thought of making it retroactive.

When the joint committee of Congress makes its report as to the reorganization of the executive departments of the Federal Government, Senator Nicholson of Colorado, the author of a bill providing for the establishment of a Department of Mines, expects to arrange a hearing at which arguments in favor of such a department can be presented at the time the general subject is being discussed.

Despite the strong plea made by the gold mining industry before the Senate Finance Committee against any duty on cyanides, there seems to be strong sentiment on the committee for protecting the domestic cyanide manufacturing industry. This does not necessarily mean that there is controlling support for a duty as high as 33 1/3 per cent. Senator Smoot of Utah emphasized a statement to the effect that not to exceed five cents worth of cyanide was used to treat a ton of ore. The argument of the gold producers is that their industry can stand no more burdens at this time, and that a duty on cyanide will add hundreds of thousands of dollars to the cost of producing gold.

The carriers have completed their oral argument before the Interstate Commerce Commission in the matter of a general reduction in freight rates. It is quite generally agreed that they did not make a strong case. On the other hand, very strong arguments are being presented by representatives of the various commodities. While no reduction is likely to be ordered before April 1, it is anticipated that the Commission will order reductions at least as great as those provided recently for grain, on basic commodities. The reductions ordered on grain averaged sixteen per cent. Only slight reductions are anticipated for high-class freight.

The public utilities commission of Utah has decided to put into effect in that state the system of accounts for public utilities adopted by the National Association of Railroad and Utilities Commissioners. This means that gas and electric companies, which hitherto have not been required to file such annual financial statements with the Utah commission, will in the future be required to do so. The order is effective as of January 1 of the present year.

British Columbia Successfully Adopts New Rule of Road

The rule of the road was successfully changed to "Keep to the Right" in British Columbia at 6 a.m. January 1, thereby bringing the province into line with the rest of the North American continent. The change involved the greatest problem for the British Columbia Electric Railway Company, which operates the electric railway lines in and around Vancouver, Victoria and New Westminster. The change is expected to bring increased prosperity through the influx of automobile tourists hitherto reluctant to attempt to drive to the left.

Work was begun six months ago on the company's street cars, steps and openings being made on the right side of cars but temporarily boarded up. On New Year's Eve, the mechanical departments of the company at Vancouver and Victoria started to rip out these temporary partitions and tie up gates on the left side. With fifteen gangs of three to five men each, the entire rolling stock in Vancouver numbering more than 200 cars was changed by 7 o'clock on the morning of January 1.

At the same time, eight line crews started work on electric switches, frogs and trolley wires, working throughout the night. Track men had 125 distinct operations to perform on the mainland lines. Most of these were performed during the night previous to the change but some of the trolley wire adjustments could not be made until cars were actually operating.

An interesting phase of the matter is the activity in corner stores in Vancouver due to the change in car loading points. A dozen transfers of deeds or leases have taken place and in a number of other instances stores are to be remodeled. A rental firm in Vancouver stated that premises at a car loading point were worth 50 per cent more than otherwise.

Los Angeles Electrical Men to Continue Public Exhibit

The free public electrical exhibit which is being conducted in conjunction with the domestic science classes of the Los Angeles Express will be continued as the result of action taken recently at a meeting of electrical interests in the southern metropolis. Mrs. Kate Vaughn, writer and lecturer on home economics and domestic science, who directs the daily classes and demonstrations, reports an ever-increasing interest in electrical appliances which will remove the drudgery of ordinary housekeeping. Economy of operation and the concerted drive which the electrical interests are making to popularize these appliances is responsible for the interest being shown by housewives, she states.

The exhibit, which represents an investment of many thousands of dollars, was visited by more than 60,000 people during 1921. Demonstrations of every type and style of appliance were given daily. Actual figures secured through the cooperation of Mrs. Vaughn, show that a total of 1207 electric ranges were sold in Los Angeles during the past year. Most of the sales can be ascribed directly to the demonstrations given at the exhibit.

California-Oregon Power Company to Extend Lines

Construction of Extension Closes Last Gap in Interconnected System From Columbia River to Mexican Border

The California Oregon Power Company has announced that it has entered into an interconnection contract to supply power to the Mountain States Power Company for a period of thirty years, the power to be used throughout the rich and fertile Willamette Valley in Oregon.

In order to supply this power, the California Oregon Power Company will construct a 115-mile high tension transmission line of 110,000-volt capacity which will extend from the Prospect plant of the company through the Rogue River and Umpqua valleys into the upper Willamette valley where it will connect with the transmission system of the Mountain States Power Company at Eugene, Oregon.

This project stands out as one of the most important power developments of recent times, as it will close the last gap of the longest interconnected power transmission system in the world, extending from northern Oregon to the Mexican border.

Paul B. McKee, general manager, announces that plans are being prepared and that the construction of this power line will begin immediately. A number of construction crews will be started in the field at once, as it is planned to complete the work this year. The 115-mile transmission line will have a capacity of 25,000 horsepower. Although of 110,000-volt construction, the line at first will be operated at 66,000 volts and will connect at Eugene with the 60,000-volt line of the Mountain States Power Company.

This marks the first step in the major hydroelectric development of the California Oregon Power Company at Prospect, on the Rogue River. The new contract will facilitate and enable the development of the company's large power resources there, thus insuring a supply of dependable power ample to take care of the future needs of the Rogue River Valley and all of southern Oregon in advance of such needs. In other words, the Rogue River valley will have the benefit of hydroelectric development in advance of the need for power.

This interconnection to the north, together with the connection with the Pacific Gas and Electric Company to the south, makes the California Oregon Power Company one of the most important links in the interconnection of power lines which now reaches from the Columbia River to San Diego and will eventually embrace the entire Pacific Coast.

The California Oregon Power Company's lines already extend from Glendale, in Douglas county, Oregon, 232 miles south to Kennett, in Shasta county, California.

Upon the completion of this new line north to Eugene, Oregon, the company's system will cover a territory extending 371 miles almost directly north and south.

Lumber Co. Protests Feather River Power Development

Protests on the part of the Hutchinson Lumber Company against the proposed hydroelectric development contemplated by Lars Jorgensen, San Francisco consulting engineer, on the Feather River in California, were heard recently before F. H. Fowler, district engineer of the U. S. Forest Service in San Francisco.

Engineers appearing for the lumber company stated that the proposed project would necessitate the re-routing of the Hutchinson logging road, construction on which is already well under way. It was pointed out that the road follows the most practicable route at the present time and that the cost of re-routing it would be at least half a million dollars. Alternative projects were suggested during the hearing, one of which was that the dam be constructed at the Middle Fork of the Feather River instead of upon the site now under consideration.

Improvement of Coos Bay on the coast of Oregon at an estimated cost of $3,310,000 has been recommended by U. S. Army engineers in a report to Congress. The report recommends the construction of jetties and the dredging of a channel 150 feet wide and 22 feet deep. The money is to be spent at the rate of $1,000,000 a year until the improvements are completed.

Terms for Sale of Timber Are Announced by Officials

Approximately 305,000,000 feet of timber in the Quinalt Indian reservation in Washington has been offered for sale by the bureau of Indian affairs, bids to be opened March 30, according to an announcement made by H. B. Steer, forest examiner at large for the Indian service, who has been at Aberdeen. The timber is about sixty per cent cedar and has been appraised at $2.50 per thousand feet. Stipulations in the contract state that an initial deposit of $15,000 must accompany each bid and that the timber must be off the land by March 31, 1935.

The District forester's office in San Francisco has announced the minimum stumpage rates which will be considered for the billion feet of timber which has been advertised in the Lassen National Forest near Eagle Lake in California, bids for which will be received until April 1. The advertised minimum rate is $4 per 1000 feet for yellow pine, $4.75 for sugar pine and $1.50 for white and red fir, incense cedar and lodge pole pine.

Under the terms of the sale, only mature and over-mature timber can be cut and every protection must be given to young trees. The timber offered for sale comprises the largest single tract ever placed on the market by the forestry department.

The Port of Portland has purchased Swan Island, a large island in the Willamette river just below the center of the city, and will immediately begin the dredging of the west channel to a depth of 32 ft., using the dredgings to fill Guilds Lake and prepare the site for the immense union freight terminal of the Northern Pacific Terminal Company. The project not only embraces a big harbor improvement but provides a site for a much needed freight terminal to relieve the present congested yards. The total cost of the project will be several hundred thousand dollars.

Utah will begin a road construction program on March 1, 1922, which will amount to $2,000,000, according to a statement made by State Engineer H. C. Means. In addition there is under consideration other jobs which will add $475,000 to the total.

Seattle Engineers Move into New Clubrooms

The Seattle Engineers' Club moved into new quarters on January first, taking over the building formerly occupied by the College Club. The new clubrooms are located within a few blocks of the financial, business and theater districts of Seattle. The new building contains a lounging room, library, card and billiard room, dining room, committee rooms and twenty-two bed rooms. The Seattle Engineers' Club is the fifth organization of its kind to obtain such club accommodations. Visiting engineers will now be able to secure sleeping quarters at the club should they desire. The Seattle club has a membership of 200 civil, electrical, mechanical, mining and chemical engineers.

Utah Utilities Commission Grants Rate Increase to Company

The Public Utilities Commission of Utah has granted an increase in lighting and power rates to the Dixie Power Company, operating in southwestern Utah, including St. George, Cedar City and intervening territory. The commission finds, in a majority decision, that to maintain the present schedule in effect on the Dixie Power company's system would be confiscatory. It does not, however, grant the company the full increase asked for.

For residence lighting the new rate provides a charge of 14 cents per kilowatt hour for the first thirty hours of monthly consumption; 11 cents each for the next 30 kilowatt hours, and 9 cents each for all over 60 kilowatt hours used per month.

The new commercial lighting rate is 14 cents for the first 30 kilowatt hours; 11 cents for the next 50; 9½ cents for the next 100, and 9 cents for all over 200.

A minimum charge for residence lighting amounting to $1.39 per month is allowed, and for commercial lighting the minimum charge is $2.00, both subject to a ten per cent discount for prompt payment.

Two schedules are allowed for municipal street lighting, one graded from $2.15 per lamp per month for each 100 candlepower lamp to $3.60 per lamp per month for each 400 candlepower lamp. The other, for multiple service, starts at $1.15 per lamp per month for each sixty candlepower lamp and grades up to $5 per lamp per month for each 400 candlepower lamp.

The cooking rate starts with 3.5 cents per kilowatt hour for the first 50 kilowatt hours and grades down to 1 cent per kilowatt hour for all over 1000 kilowatt hours.

No change is made in the present irrigation power schedule. For other purposes power may be furnished at 2300 to 11,000 volts at rates graded down from 10 cents per kilowatt hour for the first 100 kilowatt hours to 1.75 cents per kilowatt hour for all in excess of 8000 kilowatt hours. On service at 23,000 volts a demand charge of $2 per horsepower of maximum demand, plus an energy charge ranging from 3½ cents down to 7 mills is allowed.

City of Tacoma Must Pay Higher Rate for Electricity

Notice of a substantial raise in rates for furnishing the city of Tacoma with electric current to help it over its overload peak periods of the winter, outside of possible emergency demands, has been served by the Tacoma Railway & Power Company upon the city. The new basis of charges would mean paying eight times as much as the city paid during 1921, it is stated. Commissioner of Light I. R. Davisson asserts that the action is another move to harrass the city in its serving of the people and its attempt to develop additional electrical power at Lake Cushman. He states that he is prepared to contest the matter in court, to determine whether the company can suddenly interpret the contract for the mutual purchase of power, entered into in January, 1916, in a manner different from that under which it has been accepted for several years.

The company, through its superintendent of power, K. C. Schluss, asserts that the company contracted to sell the city power up to 10,000 horsepower, only in times of failure of the city plant, due to scarcity of water, breakdown or other emergency. The city contends that the company agreed to furnish the power also at any time the city plant was for any reason unable to supply its customers. Notice of the raise in rates resulted in an immediate conference of electrical contractors, dealers and manufacturers, architects and builders in the city, who urged the city to maintain its present heating rates, and continue to give service if possible to those who have installed or are now planning to install electrical heating devices.

The status of the city's legal battle against the State Fisheries Board, in the plan to develop the Lake Cushman power project, will not be known definitely until next May or June, from present indications. Appeal from the decision of the lower court, which decreed that Tacoma could not legally condemn two certain tracts in the Cushman area because of interference with the Skokomish fish propagation, will not come before the State Supreme Court until the May or June term of the court.

League to Fight California Water and Power Act

Greater California League Is Organized in Northern California to Defeat $500,000,000 Measure in November Election

Organized opposition to the state water and power act, which will appear on the ballot in the November election, has been begun by the Greater California League, which has launched its campaign against the proposed constitutional amendment which would place the water and power resources of the state under the control of a board of five politically appointed men and finance the development of these resources with state credit. The League is composed of prominent citizens drawn from every city and town in northern California.

In a preliminary statement which has been issued, the League announces that its "sole purpose is to defeat the proposed water and power act." This statement is signed by Eustace Cullinan, San Francisco attorney and president of the organization; John S. Drum, president of the Mercantile Trust Company of San Francisco and vice-president of the League; M. M. O'Shaughnessy, San Francisco city engineer; Percy V. Long, former city attorney of San Francisco; H. U. Brandenstein, former chairman of the finance committee of the San Francisco board of supervisors; A. P. Giannini, and Matt I. Sullivan, former chief justice of the Supreme Court of California.

This statement points out that the proposed measure is unsound and dangerous and that it is an attempt to gamble with the taxpayer's money. The statement continues:

"The act pledges the credit of the state, and the property of the taxpayers, to issue a letter of credit for $500,000,000, in the form of state bonds, bearing interest at the rate of not to exceed 6 per cent, to a board of five persons, whose membership is unknown, with instructions to the board to spend all or any part of the $500,000,000 in the acquisition and development of such hydroelectric projects as it may choose to undertake, and to supply water and electric power to consumer at its own price, which need not be uniform."

The league points out that this board would be entirely outside the control of the State Railroad Commission, free to finance its projects in any way it saw fit, to charge whatever rates it desired and to render any quality of service it chooses. It further points out that the present system of public utility regulation is highly satisfactory for utilities and public alike.

California Minerals for 1921 Show Increase Over 1920

Minerals produced in California during 1921 have been valued at $244,856,910 by the statistical division of the State Bureau of Mines, is a report just made public. This valuation includes only the more important of the fifty or more minerals produced in commercial quantities in the state. The estimated total for 1921 is $2,757,243 in excess of the production for 1920, due largely to increases in the amount of petroleum, gold and silver produced during the year just ended.

Petroleum leads the list in the value of the total yield. Approximately 114,000,000 barrels of petroleum were produced, bringing a total of $182,400,000. Brick, cement, building stone, crushed rock and allied products were valued at $27,000,000. Gold with a total production valued at $15,800,000, shows an increase of $1,500,000 over the preceding year. Salines, including borax, potash, salt and soda, were valued at $6,500,000, natural gas at $3,900,000 and silver at $3,500,000. The amount of silver produced is greater than for any single year in the history of the state, with the exception of 1884. Copper, lead, zinc and quicksilver all showed material decreases.

at present facing domestic producers of magnesite, quicksilver, tungsten, chromite, manganese and talc, makes it necessary that a high tariff be placed on foreign imports of these minerals if domestic production is to continue.

The Mackay Telephone company has presented an unusual request to the public utilities commission of Idaho. The request is that the telephone company be permitted to lower its rates, retroactive to January 1, 1922. The company gives as a reason that by keeping its rates as at present it would lose more subscribers than would be lost by the 25 cents per month reduction. The commission asked the company to file a formal application for change of rates.

One hundred dollars per month was taken from the salary of the manager of the electric department by the town trustees of Rupert, Idaho, when salary reductions were made which will reduce the expenses of governing the city approximately $5500 annually.

Seattle Plans to Become Wool Center of the West

Washington Wool Growers' Association Starts Movement to Raise $3,000,000 to Aid Industry in Adjacent States

In an effort to make Seattle a world-distributing center for wool, mutton and hides, nearly $3,000,000 has been pledged by men identified with the industry in this district or members of the Washington Wool Growers' Association. The proposals made at a meeting in Seattle of the association are: That the Seattle Clearing House Association agree to advance up to $2,500,000 per season to assist in the handling of wool and sheep products; that Frye and Company, packers, agree to invest $150,000 in the construction of a large, modern wool warehouse in Seattle, with the sheep men to have a voice in its control and operation; that the Washington Wool Growers' Association form a $100,000 corporation, so organized as to take advantage of the War Finance Corporation provisions to assist the growers in marketing their products.

The Port of Seattle has offered its giant port facilities to assist in every way possible in the marketing of mutton and wool, including refrigerated storage. The trans-continental rail lines, with terminals in Seattle and steamship lines in inter-coastal, east-coast and trans-pacific service, offer to pledge refrigerated service and assistance in every way possible. The Seattle Chamber of Commerce has pledged its aid in the project.

Under the present program, sheep are to be brought to Seattle for clipping and slaughtering, and this arrangement will mean the enlargement of stockyard facilities. Wool and mutton will not only come to Seattle from Washington points, but from all sections of the Northwest, including Oregon, Idaho, Montana and Utah.

The Washington Wool Growers' Association recently completed a two-day convention in Seattle. Thomas Drumheller of Walla Walla is president of the association, and J. F. Sears of Prosser, Wash., is secretary-treasurer.

Pacific Gas and Electric Company Appoints New Officials

Appointment of four additional vice-presidents as a step in a reorganization program has been announced by the Pacific Gas and Electric Company, through Wigginton E. Creed, its president. The new vice-presidents are:

A. H. Markwart, former director of engineering, who becomes vice-president in charge of engineering.

W. G. Vincent Jr., former executive engineer, who becomes vice-president and executive engineer.

Willis S. Yard, former engineer of the gas department, who becomes vice-president in charge of gas construction and operation.

R. E. Fisher, former manager of the commercial department, who becomes vice-president in charge of sales.

These four officials with P. M. Downing, vice-president in charge of electrical construction and operation, and F. A. Leach Jr., vice-president in charge of public relations, will be directly responsible to John A. Britton, vice-president and general manager.

Electricity on the Farm Shown at Denver Stock Show

Emphasis on "electricity on the farm" was made by men in the electrical industry in Denver during the recent convention of stockmen from all parts of the United States. In conjunction with the National Western Stock Show, exhibits of every type of electrical machinery or appliances which might be used on the farm were displayed and considerable interest was shown by the visiting stockmen.

Particular stress was laid upon the use of radio phones as the result of concerted moves on the part of various interests in the Intermountain district to furnish weather reports, stock market quotations and news and entertainments. Various newspapers have led in this movement until a fairly complete service is being furnished.

Northwestern Company Files on Lewis River Site

The Norwestern Electric Company of Portland has applied for a preliminary permit for the development of power on the north fork of the Lewis river in the southwestern part of the state of Washington. The development will be carried out in three separate units. The first, and upper one, known as Swift Creek unit, involves the construction of a concrete dam 170 feet high, creating a reservoir of 160,000 acre-feet capacity. A tunnel about 10 miles long will lead to a power house where 25,000 horsepower will be generated. The Cougar creek unit consists of a diversion dam and a tunnel about six miles long to a power house developing 12,800 horsepower. The lower unit, known as Conditt site, consists of a concrete dam 200 feet high, creating a reservoir with a storage capacity of 200,000 acre-feet. A power house will be built at the dam which will develop 28,000 horsepower. The application for the preliminary permit is purely formal, as no immediate development is contemplated, the action being taken to protect the company's holdings of nine or ten years.

Deschutes Irrigation Project Is Subject of Protest

The Columbia Hydro-Electric League has filed a protest with the state water board against the appropriation of 500,000 acre-feet of water for the Deschutes irrigation project to be impounded in an immense dam at the headwaters of the Deschutes, on the ground that equal provision should be made for hydro-electric development. The league suggests that instead of making provision for impounding water for irrigation there should be stored at least 1,000,000 acre-feet to be equally divided between irrigation and water power. It is set forth that the farmer needs power for manufacturing and industry as well as water for his land. A hearing will probably be held on the matter.

Books and Bulletins

The Pacific Gas and Electric Company has issued a new booklet, "The Story of the Magic Pool," a compilation of articles on the Pit river development written for the San Francisco Call by C. E. Kunze, a member of the editorial staff of that paper. The articles deal with the power resources of the Modoc lava beds and of the hydroelectric project which the company will complete in that district during the coming summer. Numerous illustrations add to the beauty of the booklet.

The American Committee on Electrolysis has issued its 1921 report, superseding the report of 1916. The report contains such statements of facts, descriptions and discussion on electrolysis testing and mitigation as the committee has agreed upon unanimously. Arrangements have been made to place the book on sale through the American Institute of Electrical Engineers in New York.

The Robbins and Myers Company, Springfield, Ohio, has issued a booklet to dealers handling their products, entitled "A Breeze That Blows Profits Your Direction." The booklet contains sales and advertising helps on the electric fans manufactured by that company, as well as containing samples of the various types of literature furnished by them.

Westinghouse turbine generator units are described and illustrated in Circular 1094-B, just issued by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This publication contains a discussion of the reactance and impulse types of turbines, both the semi-double flow type and the multiple cylinder type. Bleeder turbines and geared turbines are described, and each part of the turbine is elaborately treated.

The Pelton Water Wheel Company of San Francisco and New York has issued Bulletin No. 17, "Pelton Water Wheels (Impulse Turbines) and Reaction Turbines." The bulletin describes the various types of hydraulic equipment manufactured by the company, and discusses their application both to the generation of hydro-electric power and to the direct operation of many different kinds of machinery. Some space is also devoted to governors and to pressure regulating devices. The bulletin comprises forty-eight pages and is illustrated by a number of drawings and photographs. Copies may be obtained upon application to either office of the company.

San Francisco's purchasing power, as shown by the average amount of goods purchased per month during the last six months of 1921, exceeds that of any other city on the Pacific Coast and many of the larger cities of the U. S., according to figures which have been prepared by the San Francisco Chamber of Commerce. This purchasing power is placed at approximately three-quarters of a billion dollars per month. The figures show that one-fifth of California's wealth is credited to San Francisco.

Meetings of Interest to Western Men

Denver League Advisors Listen to Discussion of Trade

Good fellowship was the keynote of the monthly dinner meeting of the Electrical Co-operative League, which was held in Denver, January 12. Over a hundred were present and before the evening was over at least 15 of the members had been called upon to tell about their business, the economic problems confronting the industry, and the outlook for better business in 1922.

J. G. Berry, sales manager of the General Electric Co., was a guest and at the invitation of the chairman told of the observations he had made on his Western trip as to business conditions, which were of an optimistic nature.

Announcement was made at the meeting that Harry Randall, Denver manager of the General Electric Co., had consented to serve at the head of the committee which would have charge of displaying the electrical home when completed.

Welding Society Perfects San Francisco Branch

Organization steps for the San Francisco Section of the American Welding Society were completed at a meeting of men interested in this activity held at the Engineers Club, San Francisco, on January 13. At that time the following officers were elected: Professor J. C. Clark, Stanford University, chairman; H. L. Wintersgill, Westinghouse Electric and Manufacturing Company, vice-chairman; W. B. Sawyer, Jr., U. S. Steel Products Company, secretary, and K. C. Brackett, Air Reduction Company, treasurer.

The first meeting of the organization under the leadership of the newly elected officers will be held on February 17. Meanwhile members are making a drive to secure new members. At the present time twenty-six firms and three consulting engineers are represented on its rolls.

In response to the efforts of various San Francisco organizations, it has been announced that the 1922 convention of the International Association of Fire Engineers will be held in that city next fall. The Journal of Electricity and Western Industry was one of those who urged that the convention be brought to the West.

S. F. League Dedicates First Electric Restaurant

Men in the electrical industry in San Francisco dedicated the first completely electrified restaurant in the West when the San Francisco Electrical Development League met in the United Service Restaurant on January 16 for its regular weekly session. The meeting was one of the most noteworthy held by the League, as 325 members attended and many were turned away. E. O. Shreve, San Francisco manager of the General Electric Company, acted as chairman of the day, while the program included as speakers Mortimer Fleishhacker, president of the Great Western Power Company; John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company; H. F. Jackson, general manager of the Great Western Power Company, and R. T. Ling, president of the United Service Corporation, owners of the restaurant.

The electrical industry of Aberdeen and Hoaquiam, Washington, recently instigated a home-building program which will doubtless have important results in the Grays Harbor section of the Pacific Northwest. At a dinner get-together held in Hoquiam, January 18, sponsored by the Northwest Electrical Service League, about fifty lumbermen, realtors, building contractors and architects were guests of the local electrical contractors and dealers and the central power station company. The purpose of the meeting was to emphasize the need for close cooperation and harmonious understanding between all the various industries interested in the revival of building and to particularly stress the importance for the architect and builder to call into consultation early in his plans the electrical contractor.

Arthur H. Halloran, editor of "Radio," was re-elected president of the Pacific Radio Trade Association at the annual meeting held recently in San Francisco. Others elected at this time were Lieutenant Ellery Stone, Atlantic Pacific Radio Supplies Co.; vice-president, Max Loewenthal, Globe Commercial Co., secretary, and O. H. Miller, National Carbon Co., Harry Rathbun, Colin B. Kennedy Co., and E. T. Cunningham of the E. T. Cunningham Co., directors.

COMING EVENTS

MONTANA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS
Annual Convention—Butte—March 6-7, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.
Annual Meeting—Los Angeles, May 31-June 2, 1922

AMERICAN ELECTROCHEMICAL SOCIETY
Spring Meeting—Baltimore—April 27-29, 1922

NATIONAL ELECTRIC LIGHT ASSOCIATION
Annual Convention—Atlantic City—May 15-20, 1922

California Contractor-Dealers Meet in Sacramento

Decision to adopt a trade mark and discussion of renewable and non-renewable fuses were the chief features of the New Year meeting of Division One, California State Association of Electrical Contractors and Dealers, held in Sacramento on January 21.

The committee charged with selecting a trade mark was instructed to immediately adopt a design representative of the California State Association and place it in actual use. The mark will be used on stationery, membership cards and all other printed forms of the organization.

During the discussion of renewable and non-renewable fuses it was pointed out by members of an investigating committee which has been studying this subject that, although renewable fuses sold at fifty cents each and non-renewable types at twenty cents each, the renewable feature failed to justify the protection claimed by it. The report stated, "It would appear that the saving supposed to result from the use of renewable fuses is nothing more than a delusion."

Idaho Ruling Affects Bills of Political Subdivisions

According to a decision which has been rendered by the attorney general of Idaho, political subdivisions of the state are not entitled to the discount offered by utility corporations for prompt payment of bills when these bills are paid by warrant which is not good for cash until some future time.

The ruling is in the case of Madison county against the Utah Power and Light company. The county appealed to the public utilities commission for relief when the power company refused to allow the discount on presentation of a warrant to pay the bill. The commission asked the attorney general's office for an opinion in the case.

Upon receiving the above decision from the office of the attorney general, the commission added the following comment:

> Under this situation we do not see any way in which we can compel the power company to allow a discount for prompt payment if payment is in fact not made at the time, and may not be made for a considerable time in the future. We appreciate that the county has no way of paying its obligations except by warrant, but those who receive the ultimate benefit of the service rendered, that is, the taxpayers of your county, are those who must supply the funds with which to make the warrants good. If they do not do this at such times and in such amounts as permit the warrants to be paid when presented, in view of the holding of the attorney general's office, the matter is not within our power to cure.

Thirty firms and individuals represent the electrical industry in the newly organized Association of Building and Construction of Oregon, abbreviated "A. B. C.," which was recently formed in Portland. The organization represents the various building crafts, the building public, labor and others interested in building and construction. Its purpose is to foster and organize proper educational facilities for those engaged in this industry with a view of elevating the standard of craftsmanship. Stephen I. Miller Jr., executive manager of the Northwest Electrical Service League, was one of the speakers at the organization meeting.

Personals

William Piggott, president of the Pacific Coast Steel Company and of the Pacific Coast Car and Foundry Company of Seattle, was recently elected president of the Pacific Northwest Foreign Trade Conference. One of the most prominent financiers in the Northwest, Mr. Piggott is a firm believer in the policy of the commercial expansion of America by the development of foreign markets. When the 200 delegates from all parts of the Pacific Northwest met in Tacoma recently for the organization of a Foreign Trade Conference for that portion of the Pacific Coast, they were unanimous in their choice of Mr. Piggott as the man to lead this movement. Mr. Piggott was also one of the most active figures in the recent meeting in San Francisco for the formation of a $30,000,000 shipping combine to operate the vessels of the U. S. Shipping Board in Pacific waters.

WILLIAM PIGGOTT

H. H. Courtright, general manager of the Valley Electrical Supply Company of Fresno, is in the Middle West attending the convention of Lighting Fixture Dealers and Illuminating Glass Kiln at Milwaukee, Wis. Mr. Court-right is making a special study of lighting fixtures, and to this end is also visiting centers in the Northwest, having discussions and conferences of contractor-dealer leaders in that territory.

George O. Muhlfield, general manager of Stone & Webster Company, Inc., is now visiting in Japan, where an unusual amount of hydroelectric development is under way.

J. B. Brokaw has taken the position of manager of the La Grande division of the Eastern Oregon Light & Power Company, with headquarters at La Grande.

Charles H. Lee, formerly executive member of the California State Water Commission and chief of the Division of Water Rights, State Department of Public Works, has announced the resumption of his practice as a civil and consulting engineer, specializing in the development and utilization of surface and underground water, and water rights for irrigation, public water supply, power and other industrial uses. Mr. Lee has opened offices in the Holbrook Building, San Francisco.

H. D. Hawkes, sales manager of the Anaconda Copper Company, with headquarters at Great Falls, Montana, is a recent San Francisco and Los Angeles visitor.

S. L. Naphtaly has been elected vice-president of the Great Western Power Co. of California, and will be in charge of all of the activities and operations of that company. Mr. Naphtaly was born in San Francisco in 1875 and graduated from the University of California in 1896. Immediately thereafter he entered the electrical business, and in 1899 was manager of the Central Light & Power Co. of San Francisco. When this company was purchased by the San Francisco Gas and Electric Co. Mr. Naphtaly became assistant engineer in charge of the electrical department. In 1902 he was promoted to the position of manager of the electrical department and in 1903 general superintendent and chief engineer, which position he held until 1905, when the San Francisco Gas & Electric Co. was merged into the present Pacific Gas & Electric Co, at which time he became engineer of operations and maintenance of that company. In 1907 he left to become associated with the City Electric Co. of San Francisco, of which he was general manager and chief engineer. When this company was purchased by the Great Western Power Co. Mr. Naphtaly became general manager of the latter company and remained until 1913, when he resigned to complete the construction of the San Francisco-Sacramento Railway. He occupied the position of vice-president and chief engineer of that corporation. In 1917 he organized the Los Angeles Shipbuilding and Drydock Co., of which he was vice-president and general manager. That company built thirty-five steel ships for the government, and upon the completion of the work Mr. Naphtaly returned to the Great Western Power Co. to take his present position.

D. C. McClure, electrical superintendent of the Denver Gas and Electric Light Co., has been called to New York by the Doherty Company for a special conference concerning that company's operations in Denver.

Albert Sechrist, head of the electric manufacturing company of that name in Denver, is one of the directors of a drive which has been launched in that city to raise funds for the local Y. M. C. A.

F. A. Fellows, prominent electragist of Laramie, Wyo., recently visited Denver, and although the electrical home was not completed, he inspected it from top to bottom.

Sidney W. Bishop, executive manager of the Electrical Co-operative League of Denver, was recently elected vice-president of one of the largest American Legion posts in that city.

George Lewis, a Denver newspaper man, has been appointed executive manager of the Rocky Mountain committee on Public Utility Information, and offices have been opened at 302 Gas and Electric Bldg.

F. W. Roller, president of the Roller-Smith Co. of New York, is a recent visitor to San Francisco, where he spent several days previous to embarking for the Orient.

John J. Harrington, general manager and chief engineer of the Taikoo Dock and Engineering Corporation of Hongkong, arrived in San Francisco recently on his first visit to the United States. He will spend several months visiting the principal seacoast cities on both the Pacific and Atlantic coasts.

J. C. Boyle has succeeded **J. C. Thompson** as manager of the Klamath Falls division of the California-Oregon Power Company. Mr. Boyle has been in the engineering department of the company for a number of years. Mr. Thompson will take up more important work for the company, with headquarters in Medford.

Colonel Frederick J. Amweg, San Francisco civil and consulting engineer, will represent the Pacific Coast division of the American Association of Engineers at the engineering conference which is to be held in Chicago during February. Among the topics which are to be brought up for discussion at this meeting will be the standardization of fees for engineering services, license laws in the various states and other phases of engineering practice.

T. O. Kennedy, general superintendent of the Denver Gas and Electric Light Company, has been transferred from Denver to Cleveland, Ohio, where it is understood he will establish headquarters for the management of the Henry L. Doherty interests in that state. Since coming to Denver in 1917, Mr. Kennedy has been extremely active in campaigns for civic betterment, business development and the furtherance of the cooperative idea in the electrical industry. Consequently the announcement that he is to leave Colorado and the West means that the electrical industry in the Intermountain district will lose one of its most active leaders. As chairman of the Denver Electrical Cooperative League, he has made unusual headway in bringing together all branches of the electrical industry. His vision and leadership will also be sorely missed by the Rocky Mountain Division of the National Electric Light Association, of which he was also chairman. The advisory committee of the Cooperative League and other representative business organizations in which he has been active tendered him a farewell dinner at the Metropole Hotel on January 23.

T. O. KENNEDY

O. B. Coldwell, vice-president of the Portland Railway Light and Power Co., was a recent San Francisco visitor, where he spent some time in conference with California central station executives.

William Sproule, president of the Southern Pacific Co., has been appointed to the San Francisco Board of Park Commissioners. Mr. Sproule is an active figure in movements devoted to the civic welfare of San Francisco.

James H. Pohlmus, chief engineer and general manager of the Port of Portland, is in California studying the operations of the electrically driven dredges in use in the harbors of this state preparatory to placing in commission the new electric dredge which has been added to the dredger fleet of the city of Portland.

Seymour I. Hess, former mechanical inspector for the U. S. Army Engineering Department, Wheeling, West Virginia, has joined the mechanical department of the Southern California Edison Co., with headquarters in Los Angeles. Mr. Ross is a former captain in the Coast Artillery Corps and is a graduate of Cornell University with the class of 1914.

A. E. Holloway, commercial superintendent of the San Diego Consolidated Gas and Electric Company, has been elected president of the San Diego Electric Club for 1922. After graduating from Purdue University in 1909, Mr. Holloway took the apprentice course of the Westinghouse Electric and Manufacturing Company, entering the employ of the San Diego company immediately after, becoming commercial superintendent a year later. In 1921 he took over the entire commercial activities of the company. During the time he has been in charge of the commercial department the company has experienced a remarkable growth, as shown by the number of customers, which has increased from 7300 to 30,000, and the power load, which has grown from 3300 to 30,000 horsepower. Mr. Halloway has been chairman of the industrial heating committee of the Pacific Coast Electrical Association, affiliated with the N. E. L. A. He also takes an active part in the civic and commercial life of the city, having been a director of the Chamber of Commerce and a city trustee of Coronado, where he resides.

A. E. HOLLOWAY

Rex C. Starr, chief engineer of the San Joaquin Light and Power Corporation, has been named chief engineer of the Merced Irrigation District's $12,000,000 project. It will be remembered that Mr. Starr was chief construction engineer on the Kerckhoff development of the San Joaquin Light and Power Corporation and later was at the head of the construction force which built the Kern river power house for the same company. Other engineering works in which Mr. Starr has featured in a major capacity are the Huntington Lake dam for the Southern California Edison Co. and the San Joaquin and Eastern Railway. This latter work was done while he was associated with Stone & Webster. Mr. Starr will not sever his connections with the San Joaquin Light and Power Corporation, but will merely transfer his construction organization to the Merced project, which will be completed by the time the power company is ready to begin construction on its Kings river development.

Atlee B. Saurman has been appointed general sales manager of the Standard Underground Cable Co., with headquarters in Pittsburgh. It will be remembered that during his twenty years of service with this company he spent twelve years on the Pacific Coast as district manager with headquarters in San Francisco.

H. B. Price, formerly advertising manager of the Belden Manufacturing Co., Chicago, has joined the advertising agency of George J. Kirkgasser & Co., Chicago. Mr. Price will specialize in technical and electrical advertising.

T. W. French has been named general manager of the National Lamp Works. Connected with the company between 1901 and 1913 in various capacities, he later resigned to become associated with the Peerless Motor Car Co., of which he was vice-president and general manager at the time he accepted his new post with the National Lamp Works.

W. H. Vance, vice-president of the Carmean Electric Co. of Kansas City, is spending two months on the Pacific Coast in the interest of his company. He is investigating industrial conditions in Portland, Seattle, Los Angeles and San Francisco with a view of establishing a western branch factory for the manufacture of motor-driven electric heaters to supply the Pacific Coast and Oriental trade.

Eustace Cullinan, attorney-at-law, with headquarters at San Francisco, has been elected president of the Advisory Committee of the Greater California League. The purpose of the Greater California League is to defeat the proposed Water and Power Act to be placed upon the ballot of California in the fall of 1922. The act calls for the appropriation of approximately $500,000,000 to be used for the municipal development of power under a hydroelectric Commission of five men with extreme powers. Mr. Cullinan is a graduate of the Hastings College of Law of the University of California, and for many years has been associated in all forward movements in the state of California which look toward the protecting of the state's best interests.

W. H. McGrath, vice-president of the Puget Sound Light and Power Company, was a recent San Francisco visitor.

H. C. Hopkins has resigned as head of the promotion and advertising divisions of the San Francisco office of the Westinghouse Electric and Manufacturing Company to assume active partnership in the advertising firm of Dolman & Hopkins. For the past fifteen years Mr. Hopkins has been associated with the Westinghouse Company in the manufacturing, sales, advertising and sales promotion departments. During the four years of his association with the electrical industry in San Francisco he has been unusually active in contractor-dealer movements and other trade association activities. He has been a prominent member of the San Francisco Electrical Development League and has completed two terms as publicity chairman for this organization.

H. C. HOPKINS

C. Humphries, of the Mogul Company, New York, recently reached San Francisco from an extended tour of the Orient and is now investigating Western market conditions before returning to the home office of his company.

G. E. Emmons, vice-president and manager of works, and **J. G. Barry,** general sales manager of the General Electric Co., with headquarters at Schenectady, N. Y., are both recent Pacific Coast visitors.

J. G. Berry, general manager of the General Electric Company, addressed a meeting of the Electrical Co-operative League in Denver recently.

Obituary

Charles F. Schneider, general factory superintendent for the Robbins & Myers Company, died in Springfield recently. His death occurred shortly after his arrival at the plant on the morning of January 12. He entered the employ of the company in 1897 and rapidly rose to an executive position. His loss is keenly felt by his co-workers in the industry.

John M. Klein, one of the pioneers in the electrical jobbing field in San Francisco, died recently. The founder of the jobbing firm which bore his name and which was later taken over by the present Pacific States Electric Company, Mr. Klein had been retired from active participation in the industry for several years. His loss will be keenly felt by a host of friends and associates on the Pacific Coast.

S. A. Meyers, manufacturer of safety switches, race way cabinets and cut-out boxes, announces that the Meyers Electric Switch Company is now located at 575 Howard Street, San Francisco. Increased production and additional manufacturing facilities have made possible reductions in prices in the Meyers products, according to the announcement.

The Carmean Electric Company, Kansas City, Mo., manufacturers of Carmean motor driven electric heaters, has established distributing agencies on the Pacific Coast for the outlet of its products in the West and in the Orient. The California Electric Heating Company will establish offices and salesrooms in Los Angeles and San Francisco as distributors of Carmean products for California, Nevada, Utah and Arizona. The Goodman Electric Company of Tacoma, Wash., will open offices and salesrooms in Portland and Seattle as distributors for Oregon and Washington.

The Cahill-Vensano Company, San Francisco contracting engineers, announces that except with regard to the uncompleted contracts and unfinished business it has dissolved partnership. It will, however, complete all existing contracts and unfinished business, maintaining its old address of 110 Sutter Street. John R. Cahill and Edward G. Cahill have formed a co-partnership under the name of Cahill Brothers, and will engage in general contracting in the offices now occupied by Cahill-Vensano Company at 110 Sutter Street. H. C. Vensano will engage in the general contracting business under the name of H. C. Vensano & Company, with offices at 58 Sutter Street, San Francisco.

Arthur B. Lakey, sales engineer for the **Kingsbury Machine Works,** with headquarters in San Francisco, is being congratulated upon the fact that the thrust bearings manufactured by his company have been installed in the record-breaking 55,000-horsepower turbine put into operation in the Chippewa plant of the Hydro-Electric Commission of Ontario, Canada, near Niagara Falls, on December 28, 1921.

The Westinghouse Electric and Manufacturing Company has issued descriptive leaflet No. 3443, describing its new luminous top holder socket reflector. Interchangeability of parts, simplicity and ease of wiring are among the advantages claimed for these new reflectors.

The Northern Radio and Electric Company of Seattle recently moved its retail establishment from 418 Union Street to 606 Pine Street, where new and enlarged quarters will better enable it to cope with its growing trade.

R. W. Cramer & Company, 136 Liberty Street, New York City, has introduced to the American market from Switzerland the Sauter time switch, the newest development in automatic current control. This new line includes a self-winding type of switch which, it is claimed, can be sealed and left unattended for six months, at the same time automatically adjusting the moment of operation to conform with the seasonal change in the time of dusk and dawn.

The Cutler-Hammer Manufacturing Company, Milwaukee, has moved its Boston office from the Columbian Life Building to the Harvey Building. C. W. Yerger is manager of this office.

Manufacturer, Dealer, and Jobber Activities

The P. A. Geier Company, Cleveland, Ohio, is distributing a new folder on the profitableness of the Royal electric hair cutter for the shop of the progressive barber.

The Wells-Morris Manufacturing Company of San Francisco has just developed and placed on the market a new and novel electric waffle iron. The dominating features of the new device are that it turns out a round waffle that fits the plate and that a newly patented hinge at the rear of the iron makes the current connection to the top heating element. The new iron is firmly secured to a tray which forms the base, and the entire appliance is nickel-plated and highly polished.

Dolman & Hopkins, advertising specialists of San Francisco, have taken new and larger quarters in the New Call Building. The firm now occupies suites 336 and 338.

The Rutenber Electric Company, Marion, Ohio, manufacturers of electric appliances, announces the appointment as vice-president in charge of sales of **J. D. A. Cross,** for the past twenty-six years connected with the sales organizations of the General Electric Company and the Edison Electric Appliance Company. At the same time the company announces that it has adopted the trade name "Marion" for all of its products.

The Delta-Star Electric Company, Chicago, has issued a sixty-four page booklet, No. 37, devoted to outdoor substations of all voltages up to and including 66,000 volts. The booklet contains descriptive matter on substation equipment assemblies and is replete with illustrations of substations in commercial service.

The Appleton Electric Company, Chicago, manufacturers of conduit fittings, has taken over the Anderson Electric and Equipment Company of Chicago. The new company will continue to manufacture and market the Anderson line of equipment.

The Edison Electric Appliance Co. has placed **J. F. Senior** in charge of the range and oven business of that company in the Rocky Mountain region with headquarters in Denver.

The Cutter Company, Philadelphia, has issued a new bulletin describing U-re-lite circuit breakers. The booklet is replete with illustrations of commercial applications of this type of equipment.

The Sangamo Electric Company, Springfield, Ill., has issued circular No. 59, describing the Brooks two-stage current transformer manufactured by that company. The new transformer is for use with watt meters and watthour meters in making accurate load determinations.

The Steel City Electric Company, Pittsburgh, manufacturers of electrical specialties, has sent out a circular letter to approximately 200 trade advertising agencies and electrical manufacturers calling attention to the necessity of emphasizing the convenience outlet idea to aid in popularizing the use of electrical appliances.

The Ridgway Dynamo and Engine Company, Ridgway, Pa., has issued booklet No. 30, describing its line of motor-generator sets. The booklet is particularly interesting in view of the increasing application of electricity to industrial purposes. The booklet is completely illustrated.

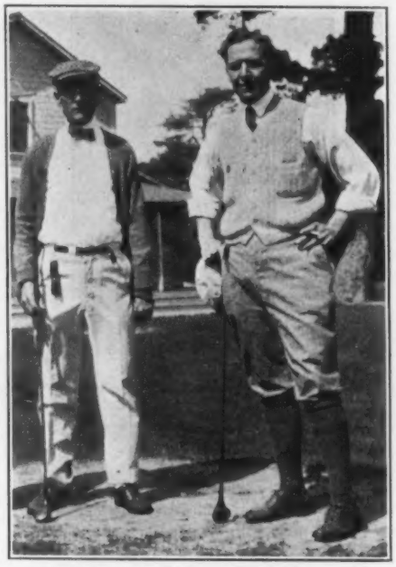
The Laundryette Manufacturing Company, Cleveland, in the current issue of the "Dryer," under the heading of "Changing People's Habits Hard in 1826," points out the manner in which habits have changed since the inception of the various types of electric appliances.

The Foulkes Electric Company, Los Angeles, was awarded the contract for the electric installation at the Exposition Park Stadium to be built in that city. The contract which approximates $20,000 will represent the most complete application of electricity to outdoor theaters and stadia in the West.

The Hendrie and Bolthoff Company, one of Denver's largest jobbers, received first prize in the class in which it exhibited a six-horse team of draft percherons at the 16th annual Western Stock Show held recently in Denver.

The Waage Electric Company, Chicago, manufacturers of heating devices, has just published new price lists showing material reductions. According to officials of the company prices are practically to the pre-war level and in some cases lower. An electric percolator and an electric curling iron have recently been added to the company's line of appliances.

The offices and warehouse of the **Gillespie Eden Corporation** in Denver have been closed and the Rocky Mountain territory placed under control of the St. Louis, Mo., branch. **Norman Olson,** former division manager, will still cover the territory.



AGE LENDS ENCHANTMENT

The exact length of time which this picture has been extant is hard to judge. Anyway it is on the "old" course at Del Monte in the days when there was a nineteenth hole. It is proof of the fact that K. E. Van Kuran, Los Angeles district manager for the Westinghouse Electric and Manufacturing Company, and C. B. Hall, secretary-treasurer of the Illinois Electric Company, should play a good game by this time.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

The attention of the Pacific Coast has been riveted on the meeting here which had as its purpose the organization of a $30,000,000 shipping combine. In all likelihood the merger will be effected as shipping interests and capitalists are solidly behind the movement. The Twelfth District Federal Reserve Bank has risen from sixth to third place among like organizations of the nation, giving rise to the belief that this district will not suffer from the financial depression which has been slowly radiating westward from eastern industrial centers.

Building permits for San Francisco and the surrounding district continue to mount. In Oakland, the transbay industrial city, permits show a gain of 248 per cent over the corresponding period last year. A severe cold spell has done some damage to early vegetable crops in the outlying agricultural districts.

LOS ANGELES

The past two weeks have been disheartening owing to a cold spell which has irretrievably damaged the citrus crop, the loss being estimated variously from twelve to eighteen million dollars. However growers feel that they will recoup somewhat from the high prices which will result from the shortage.

Building permits for January are estimated to be slightly in excess of six million dollars, a drop of one-third from the high mark set during December.

The municipal water power bonds, the sale of which to the Hellman interests was recently held up by the court, have been sold to a local syndicate at a premium of approximately $450,000, the $13,500,000 issue bringing a price equivalent to $103.337. However difficulty has been experienced in disposing of a smaller issue of library bonds.

There is considerable activity in the oil industry, several new wells having been brought in during the past two weeks.

SPOKANE

1922 has started most auspiciously, much more so than did 1921. There is a sentiment of optimism in existence much different from the feeling of uncertainty, doubt and worry which ushered in last year. Even the cold snap prevalent the middle of January has not sufficed to affect the general feeling of uplift.

The mining business which has likewise been in the doldrums, with Butte shut down practically all of last year and the Coeur D'Alenes with only part of the properties in operation and these with curtailed production, gives signs of life. The copper mines of Butte are to resume shortly and while no definite announcements have come from the Coeur D'Alenes, larger activities are confidently expected in that district this year and there is a much better feeling among the mining fraternity.

The Great Northern railway company has just called for bids for the double tracking of a portion of its track west of here and the highway work to be done by the states of Washington and Idaho, the federal government and the various counties tributary to Spokane will run at least from three to six million dollars. There is no feeling of boom in the air but just of normal healthful business development, pleasurable because of contrast with the 1921 depression.

SEATTLE

The twenty-four Seattle banks reporting to the Comptroller of the U. S. Currency, Washington, D. C., and the Washington state banking department, Olympia, following the call for statement of condition as of December 31, 1921, show aggregate deposits of $136,307,677.28, as compared with $131,434,677.28 under the call of September 6, 1921, a gain of more than $5,126,000 in less than four months' time. This is the first time since the inauguration of the era of post-war deflation early in 1920 that the bank deposits and resources of the financial houses of Seattle have shown a strong upward trend.

By placing contracts for 4,500 new freight cars, and specifying that all the lumber used in their construction must be purchased on its own or tributary lines in this territory, the Union Pacific railroad will give the sawmills of the Northwest orders for nearly $1,000,000 worth of carbuilding materials in the next few months.

Ratification of the program for limitation of naval armaments as proposed by the conference in Washington, D. C., will increase rather than decrease activities in the Puget Sound Navy Yard, Bremerton, Wash., which has been developed primarily as a repair and overhaul, and not as a construction base. The last naval appropriation bill carries $1,421,000 for the Bremerton base, of which $716,000 is for an extension to pier 5, $250,000 for seawall building and $200,000 for a 50-ton drydock crane.

SALT LAKE CITY

Bankers report that the demand for money is not pressing, and what is asked for is for investments that may be liquidated within a short time. This is the slow season of the year, and the financial stringency is also still in effect, which accounts for the fact that business among the retailers is rather quiet.

Building prospects, however, in Salt Lake City are brighter now than they have been at any time in the past three years, and it is expected that many new homes will be under construction just as soon as weather conditions permit.

Mining conditions are good, except in the copper camps such as Bingham. However, with the opening of the Butte mines it is expected that the time is not far off when the copper mines of Utah and other sections of the intermountain country will resume operations.

PORTLAND

Business, as predicted, is a little quiet following the holiday season. Retail business has been stimulated by clearance sales chiefly in wearing apparel. Jobbing orders are better than anticipated, showing that retailers' stocks have become much depleted, both in the country and city.

Bank returns issued in response to the call of the Controller of the Currency indicate that the period of shrinkage in deposits is drawing to a close. Enough lumber business is in sight from the railroads, eastern industrial centers, and the Orient, to tax the producing capacity of the mills in the Northwest during the early months of the year. Failure of wheat prices to advance prevents a free selling movement in the country and at the same time dealers are not inclined to take on supplies in view of the backward European and Oriental demand. Approximately 100,000 boxes of Oregon apples will be shipped on refrigerator steamers to England this month. A number of large buildings are under construction and many more are projected and 1922 promises to be very active in building construction. Electrical business in common with other lines is rather quiet, but the outlook for the early spring and remainder of the year is very encouraging.

DENVER

Contrary to general expectations, business during the first month of the new year showed unusual strength. After-holiday buying resulted in the movement of a large amount of staple merchandise but this condition was not reflected in the sale of electrical appliances. However, the general situation has given a tone of optimism to the outlook for the next couple of months.

Electrical jobbers still report a slow movement of stock with the possible exception of house wiring supplies. Fair weather has helped to keep building operations open and the unemployment situation is not any worse than it was 30 days ago.

Local banks report unusually large clearings for the month and this is believed due to the sale of cattle and other animals at the annual live stock and horse show which brought a large number of visitors to this city about the middle of the month.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

LEAVENWORTH, WASH.—The city council is considering building an electric light and power system, it is reported.

SEQUIM, WASH.—The Sequim Light & Power Company of Sequim recently filed amended articles of incorporation, increasing the capital stock from $3500 to $50,000.

BANDON, ORE.—The city of Bandon is now receiving electric service from its new $110,000 hydro-electric plant on Willow creek, about 20 miles from the city.

EUGENE, ORE.—The city of Eugene has filed on a power site for future development to serve the needs of the city when the present municipal plant has reached its capacity.

PORTLAND, ORE.—The city of Portland is considering the installation of a wireless system for the use of the police department such as is used in some of the eastern police departments.

LA CENTER, WASH.—The town now has electric lights for the first time in its history. Service is supplied over a transmission line erected by the Ridgefield Light & Power Company.

KLAMATH FALLS, ORE.—The box factory of the Pelican Bay Lumber Company, the largest mill in this section, was recently opened. The mill employs 60 men and will cut 80,000 ft. of lumber a day.

WALLOWA, ORE.—The 1,200-hp. hydro-electric Enterprise Electric plant, located at Wallowa Falls, was placed in service during the latter part of December. The cost of the project was about $100,000.

CANBY, ORE.—The city council of Canby has passed an ordinance submitting to the taxpayers a proposal to issue bonds in the amount of $10,000 for the purpose of installing a municipal light plant. The election will be held in February.

WENATCHEE, WASH.—Fifteen thousand acres of Grant county land is to be placed under irrigation this season by use of electric power for pumping the water from wells and from Moses lake, according to information coming from that section.

VANCOUVER, WASH.—Application for a 50-year franchise has been made to the city by the Lewis River Hydro-Electric Power Company, which was organized in May, 1921, for the purpose of furnishing light and power and eventually water to the city of Vancouver.

SEATTLE, WASH.—The B. T. U. Mills Company, L. C. Smith building, Seattle, recently incorporated with capital of $100,000, and will immediately erect a $30,000 feed mill on the south side of Lake Union canal in Fremont. George E. Baldwin is president of the company.

GRESHAM, ORE.—The Portland Railway Light & Power Company is installing a new high tension transformer substation at a cost of $10,000, which will be supplied with service from its River Mill 60,000-volt transmission line, to give the city a more adequate and reliable source of light and power service.

PORTLAND, ORE.—The Albina Electric Company, whose place of business is located at Mississippi avenue and Shaver street, Portland, has filed articles of incorporation, with W. D. Williams, L. G. Rochat and A. E. G. Karr as incorporators. The business which has been established for more than a year is to be enlarged.

SEATTLE, WASH.—The Board of Public Works, Seattle, has approved an ordinance authorizing the installation of street lights, including approximately 280 arc lights, in various residential sections of the city. The installation will approximate an expenditure of $25,000.

VANCOUVER, WASH.—It is reported that the newly incorporated Pacific States Rubber Company will be located in this city, providing a suitable site can be secured, and a plant to cost $500,000 will be erected. The company will manufacture tires and tubes and later a full line of rubber goods. A. M. Elliott is president of the new company.

PORTLAND, ORE.—It is reported that the immense Eccles timber tract in the northwestern part of the state will be opened up by the terms of a contract recently entered into between the Great Northern and Northern Pacific railway companies and Charles Keith, owner of the tract. It is said that the construction of a lumber mill with a capacity of 250,000 ft. daily is assured.

SEATTLE, WASH.—To care for increasing business in Seattle and western Washington, the General Petroleum Corporation of California will immediately spend $100,000 in additions to its oil terminals on Harbor Island in Seattle. The improvements planned include two 55,000-barrel steel tanks for fuel oil; two 10,000-barrel steel tanks for gasoline; and one 500-barrel tank for distillate. The Harbor Island tank station, as it now stands, represents an investment of $600,000.

THE PACIFIC CENTRAL DISTRICT

NEWMAN, CAL.—The National Ice Cream Company will erect a new plant here in the near future.

SUSANVILLE, CAL.—At a recent election bonds for $50,000 were voted for the Susanville school district.

OAKLAND, CAL.—A five-story concrete addition is contemplated to the Prince Canning Company's plant at 20th avenue and E. 10th street, to cost $75,000.

MARYSVILLE, CAL.—The Virden Packing Co. has awarded a contract for the erection of a $250,000 plant to the McGillivray Construction Co. of Sacramento.

NEWARK, CAL.—The James Graham Manufacturing Company, manufacturers of stoves and fixtures, is planning the erection of a reinforced concrete building to cost $50,000.

NAPA, CAL.—The Napa Valley Ice & Storage Co. is contemplating the erection of a $75,000 plant in this city. A station will also be located at St. Helena and one at Calistoga; also one each at Vallejo, Fairfield and Vacaville.

FRESNO, CAL.—Plans have been announced by H. Myers, vice-president of the A. Meister Sons Company of Sacramento, for the opening of a plant in this city where electric and gasoline street cars, auto bodies and tops will be built. The new plant will represent an outlay of approximately $150,000.

SAN FRANCISCO, CAL.—H. Bardue, vice-president and general manager of the Direct Steel Process Company, with offices in San Jose and an experimental plant in Alameda, was recently in San Francisco to negotiate the financing of a producing plant in or adjacent to San Francisco with a capacity of 400 to 500 tons of steel per day.

SANTA ROSA, CAL.—Walter Proctor has been awarded the contract for building Grace Bros.' new ice plant, which will be constructed of steel and reinforced concrete.

MARTINEZ, CAL.—Tht California Car Company, manufacturers of motor-propelled railroad cars, has purchased six acres of land near Muir Station, where work on the construction of the first unit of buildings for its plant is being started.

NAPA, CAL.—The California Prune and Apricot Growers' Association is planning the construction of a $100,000 plant in this city, according to Henry Wheatley, Napa representative. Four graders will be installed and a double processing used.

MERCED, CAL.—The Merced Concrete Pipe company has signed a contract with the State Land Settlement Board at Delhi for furnishing material and labor required to install a 36-mile concrete pipe irrigation system. The size of pipe to be used in the system is from 8 to 30 in.

YREKA, CAL.—The office of the Klamath National Forest has received plans and specifications for the $75,000 wagon bridge to be erected over the Klamath River between Happy Camp and the mouth of the Salmon River. The bridge will be a single span of 309 ft. 10 in. and will contain 245 tons of structural steel.

OAKLAND, CAL.—The Pacific Gas & Electric Company has started construction on its Claremont substation, located on the north shore of Lake Temescal, south of the Tunnel road. The building will be of steel and concrete and completely equipped with electrical machinery. The entire cost is estimated at $250,000.

SAN JOSE, CAL.—H. C. Dunlap, secretary of the California Prune and Apricot Growers' Association, has announced that the purchase of a site for a branch packing plant at Colusa has been authorized by his company. The site agreed upon is located near the Southern Pacific station, where it may be reached by both Southern Pacific and Sacramento Northern Railroad tracks.

PLACERVILLE, CAL.—Announcement has been made by the El Dorado Water Company management that a storage reservoir on Webber Creek will be constructed to provide water for irrigation purposes. The dam will be 120 ft. high. Estimated cost is $250,000.

TURLOCK, CAL.—At a recent meeting of the Chamber of Commerce, Chas. Northcutt, division manager of the Pacific Gas and Electric Company, announced that his company has made an appropriation for extensive reconstruction of the electric service to Turlock. The plans call for a new 60,000-volt transmission line from Modesto to Hughson, a new substation at Hughson and the rebuilding of the Turlock substation.

THE INTERMOUNTAIN DISTRICT

NAMPA, IDAHO.—The city of Nampa is investigating the cost of installing and operating a municipal electric light plant.

PUEBLO, COLO.—A new state armory to cost $65,000 will be located at the state fair grounds. Contracts have been let and construction will start immediately.

LAMAR, COLO.—Bids were opened by Architect J. J. Huddart of Denver, January 23, for the construction of a state armory here to cost in the neighborhood of $50,000.

PRICE, UTAH.—The city of Price is contemplating many improvements for the coming year, among which are a number of power and light extensions and improved street lighting on Main street.

COLORADO SPRINGS, COLO.—The immediate construction of a $400,000 municipal auditorium is now assured through the sale of the complete bond issue to a Denver brokerage firm at a premium.

DENVER, COLO.—Martin Beck, president of the Orpheum vaudeville circuit, has announced that a new "junior" playhouse will be erected by his company shortly and will be ready for the fall opening.

DENVER, COLO.—Henry I. Seeman has completed plans for a four-story apartment building which will cost $100,000. It will be located in the exclusive residence district and will be ready for occupancy by September 1.

DENVER, COLO.—The C. S. Lambie Company has been awarded the contract for the construction of the first $100,000 unit of the Super-Service Motor Association, which is sponsoring a co-operative auto repair factory in which a number of prominent local men are interested.

VIRGINIA CITY, NEV.—A mine plant costing about $130,000 is to be installed near the portal of the Hale & Norcross tunnel, according to announcement by the management. Approximately $150,000 will be expended on development work at the Middle Mines group.

SALT LAKE CITY, UTAH.—George W. Davy of Salt Lake City has filed application with the state engineer for the use of 25 sec.-ft. of water from the Otter Creek or Daniels Creek in Sevier county, to be used in developing 1400 hp. of electrical energy. Plans contemplate developing this horsepower under a head of 724 ft. for use in Sevier, Emery and Wayne counties.

TONOPAH, NEV.—The completion of four buildings at the West End Chemical Company's borax mine, 26 miles from Las Vegas, means that the company now has adequate facilities for housing its men and offices. Major Luckhardt stated that in about four months the company's mill will be completed. This mill will be built at the mine and not at Nye station, as reported.

THE PACIFIC SOUTHWEST

SAN PEDRO, CAL.—Pacific avenue will have an ornamental lighting system from Third street to Fourteenth street. The contract has been awarded to the H. H. Walker Company of Los Angeles for $18,297.

TROPICO, CAL.—C. L. Peck has the general contract for the mausoleum to be erected for the Forrest Lawn Cemetery. T. Patterson Ross of San Francisco is the architect. The cost will be $300,000.

SAN DIEGO, CAL.—The new Mission Valley detention home will be built by Contractor R. A. Jackson for the sum of $32,225. Contract awarded by the county provides for immediate opening of the construction.

NATIONAL CITY, CAL.—State Harbor Commission has received the application of the California Gypsum Company for a lease on 40 acres of tidelands on which to erect a gypsum factory. The cost is estimated at $250,000.

LOS ANGELES, CAL.—The Board of Harbor Commissioners has awarded to the United Dredging Company of Los Angeles a contract for dredging the harbor, contract price, $243,904. A concrete wharf to cost $250,000 will be built by the city and leased to the Vegetable Oil products Co. when completed.

SANTA ANA, CAL.—A large concrete public garage will be erected for Knox & Stout at 522 N. Main street. The contract has been awarded to Ross & Ritchie of Long Beach for the sum of $60,000. E. M. Fraser is the architect.

LOS ANGELES, CAL.—Articles of incorporation have been granted to the Imperial Cotton Mills Company authorizing the issuance of $1,500,000 in stock. All of the directors are in Los Angeles. Jefferson P. Chandler is attorney for the company.

FULLERTON, CAL.—Contract for the new high school was awarded to Edwards, Wildey & Dixon of Los Angeles. The bid was $184,500. Reed & Farley were awarded the electrical work at $10,850. The group of buildings will be connected by a system of arcades.

ONTARIO, CAL.—Work on the new city fire hall will begin at once following the contract made between the city and Campbell Construction Company of this city. The permit calls for $25,000. The building will be erected at the corner of Euclid and Transit streets.

LANCASTER, CAL.—The Antelope Valley union high school will cost $184,000, according to contracts which have been signed with Wopschall Bros. of Pasadena. Architect John C. Austin advises that work will be started during January or February.

TURLOCK, CAL.—The bids for the cement for the Don Pedro dam, amounting to 100,000 bbls., were accepted and the Old Mission Portland Cement Company of San Juan Baptiste was given the contract at $2.19 per bbl. f. o. b. plant. All bids for steel were rejected.

SAN PEDRO, CAL.—Pacific Coast Borax Company, through its local representative, has purchased a 9-acre tract of land from the Chandler Shipbuilding Company on which it proposes to construct a borax plant. The site is adjacent to Los Angeles harbor.

SAN PEDRO, CAL.—The United Dredging Company was successful bidder for the removal of 2,060,000 yards in the east and west basins of the harbor. The contract was referred to the city attorney for approval. The price stated in the bid was $243,904.

LOS ANGELES, CAL.—William Davidson, chief county mechanical engineer, is preparing plans for the additions to the Museum and Art building at Exposition Park. The buildings will be of class A construction, with steel frame and tile roofs. The cost is estimated at $400,000.

BURBANK, CAL.—Architect Richard D. King is taking bids for the group of buildings to be erected for the American Aluminum-Metal Products Company. The seven buildings will have brick walls, composition roofs, and steel sash and skylights.

LONG BEACH, CAL.—Loy L. Smith is preparing plans for the 12-story hotel to be erected opposite the municipal park for the Park View Land Company. The hotel will have 325 guest rooms and 10 stores on the ground floors of the Pike and Ocean avenue frontages. The cost is estimated at $800,000.

LOS ANGELES, CAL.—The L. A. Automotive Company has contracted with the Moran Company for the erection of its new factory building, for the assembling of electric commercial trucks. This unit will be a structural steel building with saw-tooth roof and approximate dimensions of 250 ft. by 50 ft.

LOS ANGELES, CAL.—Seven hundred and fifty thousand dollars will be expended for residential flats and apartments near the Bimini Baths, between 1st and 3rd streets. J. J. Warrick and Dr. C. M. Walters have retained John J. Frauenfelder as architect for the structures. The buildings will be 6-story and will occupy the entire frontage of 829 feet. The work has been started.

LOS ANGELES, CAL.—The Eastern Outfitting Company will occupy new quarters at Ninth and Broadway, according to the plans announced by the company. A new building of 6 stories, with provision to add 2 stories later, will be erected at a cost of $300,000. The Milwaukee Building Company is preparing the plans.

LOS ANGELES, CAL.—The Automobile Club of Southern California has contracted with C. J. Kubach Company for its new office building to be erected at 26th and Figueroa streets. According to the plans of Hunt & Burns, the building will occupy a ground space of 267 by 207 ft., and will cost approximately $500,000 without furnishings or equipment.

LONG BEACH, CAL.—The city attorney is preparing the resolution for the special bond election to vote bonds to the amount of $1,925,000. Six propositions are involved. A memorial auditorium to cost $1,000,000; $500,000 for parks and playgrounds; $100,000 for incinerator and sewage disposal; and $50,000 for comfort stations. No opposition has developed to the bonds.

PHOENIX, ARIZ.—A new union station to be used by the Santa Fe and Arizona Eastern railways jointly will be erected at an expense of $300,000, according to the plans approved by the Arizona Railway Commission. Plans are by the engineering department of the Santa Fe Railway, under the direction of W. H. Mohr.

LOS ANGELES, CAL.—John J. Frauenfelder, architect, has announced that a $750,000 housing project of the Bimini Water Co. calls for erection of 58 residence apartment buildings, and is to cover the entire area bounded by Bimini Place and Vermont Ave., extending from 1st to 3rd Sts.

LOS ANGELES, CAL.—The 6-story warehouse, later to be increased to 8-story, for the Westinghouse Electric and Manufacturing Company, will be designed by Noerenberg & Johnson, architects. The building is to be class A construction, equipped with 8 elevators and 5 traveling cranes.

LOS ANGELES, CAL.—The new First M. E. Church has started the work on its new structure by awarding the steel contract to Baker Iron Works for the sum of $91,326. John C. Austin, architect, states that other contracts will be let at once to prevent delays in building this large edifice.

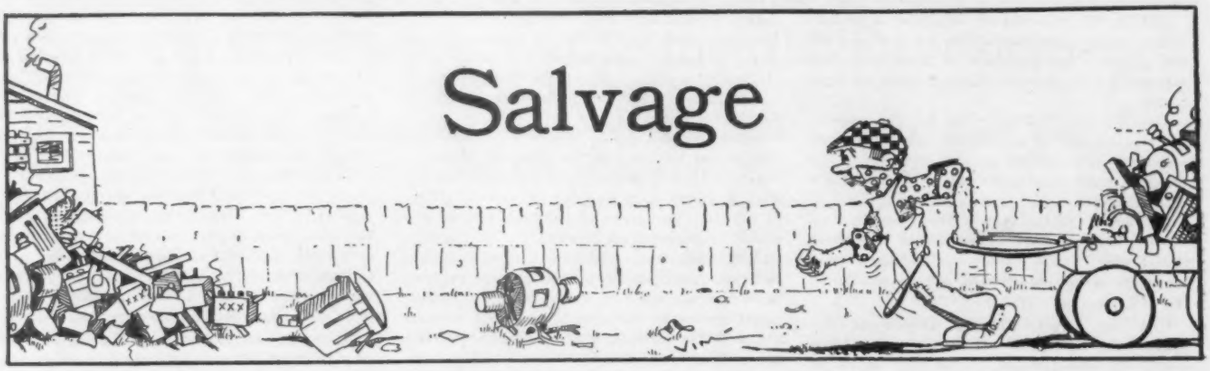
CALEXICO, CAL.—The Pacific Fruit Express Company will erect a large ice-making and storage plant in this city. The yearly increase in perishable vegetables and fruit from this section has necessitated the shipping in of thousands of cars of ice. The increase of local plants will reduce this expense and improve the service to local growers.

LOS ANGELES, CAL.—Fred Hartstrite will have a class A store and loft buildig at the corner of Spring and Court streets. Grinnel Sprinkler Company was awarded the contract for sprinkler system and Prewit Electric received the electrical work. The total cost of the general contract was $52,363. A. S. Niebeker, Jr., is the architect.

HOLBROOK, ARIZ.—The Interstate Commerce Commission has been asked to approve the issuance of notes and stock to finance the building of 73 miles of railroad between Holbrook and Cooley, in Arizona. The application of the Apache Railway Company estimates the cost to be $455,000.

PHOENIX, ARIZ.—Dr. W. C. Ellis has commissioned the Milwaukee Building Company of Los Angeles to prepare the plans for his 5-story office building to be erected at the corner of Second street and Monroe avenue. Seven stores and 84 suites of offices will be provided. The total cost is estimated at $300,000.

KINGMAN, ARIZ.—Col. J. C. Greenway announces that the work on the development of power at Diamond Creek, on the Colorado River, will begin in earnest in the fall. The copper interests of this section have joined in developing this 160,000 hp. and the larger part of the power will be used by the mining interests of the state. It is proposed to divert the Colorado River through a tunnel while the dam is being constructed.



An Old Favorite as Rendered by Sadie Wimp
OHM SUITE TOME

Mid play sure sand palaces
Wear rare we mare ohm,
Beet averse oh hum bull
Their snow play sly comb.

H Arm from this guys
Seem stew Hal Lois their;
Though use eke threw the world
'Tis snare met with hell swear.

* * *

"The white rhinoceros and mountain antelope are fast becoming distinct," according to the San Francisco Journal of Commerce. Due undoubtedly to the advent of prohibition brew which permits of a better focus on pink rattlesnakes and purple elephants.

* * *

Toonerville Electric News

The new lighting plant in a Colorado town is explained in the local paper as an advance over the former system. The current, it says, "has been changed from 230-v. direct and will operate at 110-v. alternately."

* * *

A Wyoming paper reports:
"Mr. ——, superintendent of the local plant of the power company, has been notified that he has been elected a member of the National Electric Light Association. . . . Inasmuch as this election was entirely unsolicited, it comes as a great honor and a recognition of Mr. ——'s standing in the electrical world."

* * *

The Tale of a Fisherman as Revealed by the Market Reports

Fish Inactive
General Tone Dull
Rye Lifts Consistently
Bean Situation Barely Steady
Salmon Light on Spot
Metal Undertone Slips
Dressed Meat Down Sharply
Extra Eggs Break at Six
Corn Hits Lowest Level
Fish Rises After General Drop.

* * *

He Looked Forward to Being Back

One of our electrical friends, recently returned from a trip to the Orient, reports that he was such a poor sailor that, although he made the trip by steamer, he nevertheless traveled by rail.

Which reminds, for some unaccountable reason, of the returned soldier who used to be somewhat fast and in consequence a bit slow. He used not to be up to being down on time. But since he has been back from the front, he has been early of late. He was always behind before. But now he is first at last.

* * *

If You Know the Keyboard, You Will Appreciate This

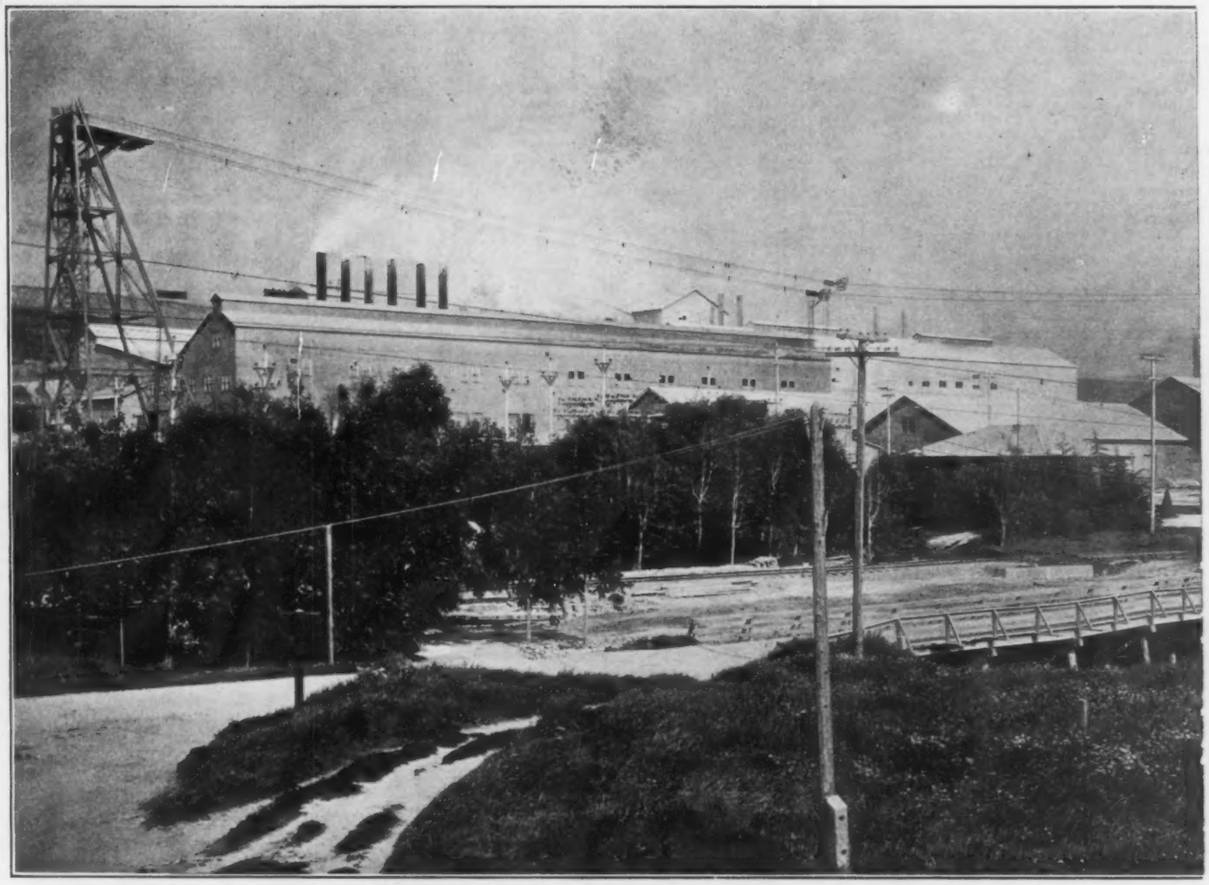
-y atenofracherVs gine tp the coyntry,
Mu srenigrzpher"a gome fat awau.
Mh stenoftsoherVs fone ro hte counret H
As 8 have beeb tryind tp say.
9h brinf nacj, nrinh bqck, on neinf nack ,y "onnie to mr tp me &
Nring nack. neomh back, oh brinf bac, my nemmie ro me,

* * *

ELECTRICAL HYBRIDS

XX — The Carbon Brushian Dancer

The carbon brushian dancer is a very shocking lady;
She's a pick-up of the most magnetic sort.
Her skin is copper colored and her composition's shady;
She collects from those she touches like a sport.
Though supported by the holder, she will press the commutator
And spark with him—which shows that she is bad.
From positive to negative her feelings alternate her
And the Polish revolutions are her fad.



Over 1,400,000 hp. in installed capacity was reported from the large industrial plants of the West in the survey reported below, of which 1,135,000 hp. or 95 per cent was connected to power company lines. Cement plants are among the largest individual users of electric power. An analysis of the figures listed will be found on pages 107-109 of this issue.

Comprehensive Listing of Industrial Plants in the Western States Using 100 Hp. and Over, From an Extensive Survey Conducted by the Journal of Electricity and Western Industry

ABBREVIATIONS AND SYMBOLS

Horsepower rating as given in the third column refers to the installed capacity of the plant. The nature of the prime mover is indicated by the small letters in parenthesis following the figures, as follows:

Electric Power	(e)
Steam	(s)
Water Power	(w)
Oil Engines	(D.E.)
Isolated Plants — nature of power unspecified	(i)

Where the financial rating of the plant was also given, this is expressed by letters, with the following significance:

Plants rated at $1,000,000 or over	F
Plants rated at from $500,000 to $1,000,000	E
Plants rated at from $100,000 to $500,000	D
Plants rated at from $50,000 to $100,000	C
Plants over $50,000, rating unspecified	B

Where letters are omitted, no data was at hand as to the classification of the plant.

ARIZONA

Bisbee—Bisbee Naco Water Co.	Water	450 H.P. (DE)300(s)		D
Chloride—Arizona Brunswick Mining Co.	Mining	Over 100 H.P. (e)		B
Arizona Ore Reduction Co.	Mining	Over 100 H.P. (e)		B
Schuylkill Mining Co.	Mining	Over 100 H.P. (e)		B
Clarkdale—Clarkdale Improvement Co.	Ice	127 H.P. (e)	B	
Clifton—Clifton Water & Improvement Co.	Water	170 H.P. (DE)	C	
Flagstaff—Arizona Lumber & Timber Co.	Lumber	500 H.P. (s)	F	
Flagstaff Lumber Co.	Lumber	500 H.P. (s)	D	
Greenlaw Lumber Co.	Lumber	500 H.P. (s)	C	
Gold Road—Gold Road Mines Co.	Mining	Over 100 H.P. (e)		B
Gold Ore Mining Co.	Mining	Over 100 H.P. (e)		B
Humboldt—Consolidated Arizona Smelting Co.	Mining	Over 100 H.P. (e)		D
Jerome—United Verde Extension Mining Co.	Mining	Over 100 H.P. (e)		B
Kingman—C. O. D. Mines, Inc.	Mining	Over 100 H.P. (e)		B
Emerald Isle Copper Co.	Mining	Over 100 H.P. (e)		B
Miami—Inspiration Consolidated Copper Co.	Mining	Over 100 H.P. (e)		B
Morenci—Morenci Water Co.	Water	640 H.P. (s)	B	
Oatman—Arizona Mossback Mining & Milling Co.	Mining	Over 100 H.P. (e)		B
Orion Mining & Milling Co.	Mining	Over 100 H.P. (e)		B
Tom Reed Gold Mines Co.	Mining	Over 100 H.P. (e)		B
United American Mining Co.	Mining	Over 100 H.P. (e)		B
United Eastern Mining Co.	Mining	Over 100 H.P. (e)		B
Prescott—City of Prescott	Pumping	Over 100 H.P. (e)		
Northside Pumping Co.	Water	2000 H.P. (e)	B	
Prescott Water Works	Water	250 H.P. (e)	B	B
Turkey—Kay Copper Co.	Mining	Over 100 H.P. (e)		B
Walter—Sheldon Mining Co.	Mining	Over 100 H.P. (e)		B

CALIFORNIA

Alameda—Dow Pump Works.....Pumps.....250 H.P. (DE)
Alhambra—Belvedere Water Co.....Pumping....240 H.P. (e)
City of Alhambra.....Pumping....205 H.P. (e)
Petroleum Midway Co.....Oil.....235½ H.P. (e)
Simon's Brick Co.....Brick.....282½ H.P. (e)
Standard Felt Co.....Felt.....541½ H.P. (e)
Union Oil Co.....Oil.....312½ H.P. (e)
Amador—Bunker Hill Consol. Mining Co.....Mine.....788 H.P. (e)
Fremont Cons. Mining Co.....Mine.....287 H.P. (e)
Treasure Mining Co.....Mine.....635 H.P. (e)
Antioch—Antioch Lumber Co.....Lumber.....145 H.P. (s)
California Paper Board Mill (Paraffine Companies).....Mill.....3500 H.P. (s)
Avon—Associated Oil Co.....Oil.....746 H.P. (e)
Bakersfield—Southern Pacific Co.....Shops.....450 H.P. (e)
Bay Point—Coos Bay Lumber Co.....Lumber.....350 H.P. (e)
Benicia—Yuba Manufacturing Co.....Factory.....370 H.P. (e)
Berkeley—University of California.....Buildings....1200 H.P. (e) 250 H.P. (e)
Betteravia—Rice Ranch Oil Co.....Oil.....230 H.P. (e)
Union Sugar Co.....Sugar.....1000 H.P. (e)
Union Oil Co.....Oil.....205 H.P. (e)
Western Union Oil Co.....Oil.....425 H.P. (e)
Brawley—Imperial Ice & Dev. Co.....Ice.....564 H.P. (e)
Calexico—Compania de Agua y Luz Electric.....Pumping....930 H.P. (e)
Compania Algoderera de la Baja Cal...Irrigation....460 H.P. (e)
Goree-Hartman.....200 H.P. (e)
Imperial Ice & Development Co.....330½ H.P. (e)
Calwa—Calwa Ice Plant.....Ice.....1217½ H.P. (e)
Campo Seco—Penn Mining Co.....Mine.....377 H.P. (e)
Chico—Diamond Match Co.....Matches....2999 H.P. (e)
Clearinghouse—Original Mining & Milling Co.....Mine.....205 H.P. (e)
Colfax—Rising Sun Cons. Mines Co....Mine.....150 H.P. (e)
Corona—Corona Foothill Lemon Co....Fruit.....305 H.P. (e)
Exchange By-Products Co.....210 H.P. (e)
Temescal Rock Co.....Gravel.....1352½ H.P. (e)
Temescal Water Co.....Irrigation....491 H.P. (e)
Coulterville—White Gulch Mine.....Mine.....212 H.P. (e)
Crockett—Calif.-Hawaiian Sugar Co...Refinery....6000 H.P. (s)
Dorris—Dorris Box & Lumber Co.....Lumber.....351 H.P. (e)
Associated Lumber & Box Co.....Lumber.....608 H.P. (e)
Dunsmuir—Southern Pacific Co.....Shops.....240 H.P. (e)
East Auburn—Oro Fina Mining Co....Mine.....285 H.P. (e)
El Centro—City of El Centro.....Pumping....233 H.P. (e)
Elsinore—L. A. Pressed Brick Co.....Brick.....805½ H.P. (e)
Eureka—California Central Creameries..Creameries...439 H.P. (e)
Fresno—Benham's Ice Cream Co.....Ice Cream...277 H.P. (e)
Calif. Assoc. Raisin Co.....Packers....1542½ H.P. (e)
Calif. Peach Growers.....Boxes.....215 H.P. (e)
Calif. Products Co.....Cotton Gin Prod.....400 H.P. (e)
Craycroft-McKnight Co.....Brick.....422½ H.P. (e)
Fresno Consumers Ice Co.....Ice.....412½ H.P. (e)
Fresno Laundry.....Laundry....100 H.P. (i)
Fresno Republican Pub. Co.....Newspaper...237 H.P. (e)
Fresno Rock Products Co.....Rock.....350 H.P. (e)
Grant Rock & Gravel Co.....Rock.....501 H.P. (e)
Hollenbeck-Bush Co.....Mill.....309½ H.P. (e)
Madary's Planing Mill.....Mill.....494½ H.P. (e)
Mattei Building.....Building....200 H.P. (i)
Pacific Gas & Elec. Co.....Gas.....405 H.P. (e)
Peoples Ice Co.....Ice.....908 H.P. (e)
Piedra Rock Co.....Rock.....815½ H.P. (e)
Rosenberg Bros. Co.....Packers....560 H.P. (e)
Sperry Flour Co.....Mill.....339 H.P. (e)
Standard Oil Co.....Oil.....670 H.P. (i)
Fullerton—Anaheim Sugar Co.....Factory....1400 H.P. (e)
Anaheim Union Water Co.....Pumping....250 H.P. (e)
Anaheim Union Water Co.....Pumping....1050 H.P. (e)
Bardeen Corporation.....Pipe.....300 H.P. (e)
City of Fullerton.....Pumping....375 H.P. (e)
Los Alamitos Sugar Co.....Factory....850 H.P. (e)
Standard Oil Co.....Oil.....260 H.P. (e)
Union Oil Co.....Oil.....200 H.P. (e)
Union Oil Co.....Oil.....200 H.P. (e)
Yorba Linda Water Co.....Pumping....1180 H.P. (e)
Grass Valley—Empire Mines & Invest. Co.....Mines.....4009 H.P. (e)
Idaho-Maryland Mines Co.....Mines.....850 H.P. (e)
North Star Mines Co.....Mines.....2471 H.P. (e)
Sultana Gold Mining Co.....Mines.....262 H.P. (e)
Hamilton—Mills Orchard Corporation.....683 H.P. (e)
Hammonton—Yuba Consol. Gold Fields.Gold.....6645 H.P. (e)
Hanford—Kings County Packing Co...Cannery....240 H.P. (e)
Hilt—Fruit Growers Supply Co.....Boxes.....700 H.P. (e)
Hornitos—Ruth Pierce Co. Mine.....Mine.....128 H.P. (i)
Jackson—Argonaut Mining Co.....Mine.....826 H.P. (e)
Keeler—Natural Soda Products Co....Chemicals...712½ H.P. (e)
Kennett—U. S. Smelting, Ref. & Min. Co.....Smelter....1386 H.P. (e)
Kerman—Globe Milling Co.....Meal.....235 H.P. (e)
Keswick—Mountain Copper Co.....Mine.....1155 H.P. (e)
Lancaster—General Petroleum Co....Pumping....450 H.P. (e)
Standard Gold Mining Co.....Mines.....300 H.P. (e)
U. S. Potash Co.....Potash.....1960 H.P. (e)
Lewiston—Trinity Dredging Co.....Dredging....485 H.P. (e)
Lindsay—Lindsay-Strathmore Co.....Pumping....275 H.P. (e)
Lindsay-Strathmore Co.....Pumping....1585 H.P. (e)
Lindsay-Strathmore Co.....Pumping....1900 H.P. (e)
Lompoc—Celite Products Co.....Insulating Pr.1250 H.P. (e)
Long Beach—Hayward Lumber Co....Lumber.....281 H.P. (e)
Home Ice & Cold Storage Co.....Ice.....249½ H.P. (e)
Jewel City Amusement Co.....Resort.....400 H.P. (e)
Long Beach Racing Coaster.....Amusement...208 H.P. (e)
Long Beach Sash & Door Co.....Wood Prod...208½ H.P. (e)
Long Beach Water Department.....Pumping....1255 H.P. (e)
Los Angeles—Alexandria Hotel.....Hotel.....700 H.P. (e)
Alfred Ice Cream Co.....Shop.....208 H.P. (e)
American Laundry Co.....Laundry....200 H.P. (e)
American Refrigeration Co.....Ice.....200 H.P. (e)
Baker Iron Works.....Iron Works..1481.3 H.P. (e)
Bible Institute.....Hotel.....300 H.P. (e)
Blinn Lumber Co.....Lumber.....320 H.P. (e)
Broadway Co.....Dept. Store..1000 H.P. (e)
Brunton Studio.....Mov. Pictures450 H.P. (e)
Brunton Studio.....Mov. Pictures235 H.P. (e)
Bullocks.....Dept. Store..200 H.P. (e)
Capitol Milling Co.....Flour.....300 H.P. (e)
Chester Prod. Co.....Mov. Pict...225 H.P. (e)
Citizens Ice Co.....Ice.....500 H.P. (e)
Clark Hotel.....Hotel.....225 H.P. (e)
L. J. Christopher.....Ice Mach....327 H.P. (e)
Cudahy Packing Co.....Packers....781 H.P. (e)
Diamond Laundry.....Laundry....300 H.P. (e)
Douglas Building.....Building....285 H.P. (e)
Evening Herald.....Newspaper...593½ H.P. (e)
Express Tribune.....Newspaper...323½ H.P. (e)
Fairchild Gilmore, Wilton Company...Contractors...330 H.P. (e)
Ford Motor Co.....Shop.....800 H.P. (e)
Fox Film Co.....Pict. Studio..1070½ H.P. (e)
Frice Art Studio.....Pict. Studio..300 H.P. (e)
Globe Grain & Milling Co.....Flour.....643 H.P. (e)
Great Western Milling.....Flour.....477.42 H.P. (e)
Hall of Records.....Building....300 H.P. (e)
Hammond Lumber Co.....Lumber.....1000 H.P. (e)
Hamburger's.....Store.....1000 H.P. (e)
Hart Bros.....Hotel.....234.66 H.P. (e)
Hauser Packing Co.....Packers....305½ H.P. (e)
Hawthorne Furn. Mfg. Co.....Furniture...419 H.P. (e)
Hollenbeck Hotel.....Hotel.....200 H.P. (e)
Kling Co.....Saws.....193 H.P. (e)
Lacy Mfg. Co.....Iron Wks....700 H.P. (e)
Lasky Co.....Pict. Studio..295½ H.P. (e)
Layne & Bowler Corp.....Machinery...281 H.P. (e)
Llewellyn Iron Works.....Iron Wks....1257 H.P. (e)
Los Angeles Examiner.....Newspaper...543 H.P. (e)
Los Angeles Foundry.....Foundry....1120 H.P. (e)
Los Angeles Ice & Cold Storage Co....Ice.....1000 H.P. (e)
Los Angeles Times.....Newspaper...721 H.P. (e)
Los Angeles Union Terminal.....Refrigeration.1932 H.P. (e)
Merchants Ice & Cold Storage.....Ice.....1000 H.P. (e)
Metro Picture Corp.....Pict. Studio..704½ H.P. (e)
National Ice & Cold Stor. Co.....Ice.....800 H.P. (e)
Nicholl Loomis Co.....Feed.....341 H.P. (e)
Pacific Reduction Co.....Hoist.....459 H.P. (e)
Pacific Sash & Door Co.....Doors.....626 H.P. (e)
Peerless Laundry.....Laundry....326.2 H.P. (e)
Poultrymen's Coop.....Grain-Mill'g..210 H.P. (e)
Robertson & Cole.....Mot. Pict...523½ H.P. (e)
Robinson Co., J. W.....Dept. Store..232½ H.P. (e)
Rosslyn Hotel.....Hotel.....600 H.P. (e)
Security Trust & Sav. Bank.....Building....249½ H.P. (e)
Southern Pacific Co.....Shops.....1172 H.P. (e)
Simons Brick Co.....Brick.....278½ H.P. (e)
Sperry Flour Co.....Flour.....500 H.P. (e)
Jas. Shultz Lumber Co.....Lumber.....312 H.P. (e)
So. Cal. Iron & Steel Co.....Steel Mill...580 H.P. (e)
So. Cal. Gas Co.....Gas.....187½ H.P. (e)
Title Ins. Bldg.....Building....205 H.P. (e)
Trinity Hotel.....Hotel.....275 H.P. (e)
Union Ice Co.....Ice.....1000 H.P. (e)
Van Nuys Bldg.....Building....325 H.P. (e)
Vitagraph Film Co.....Pict. Studio..465 H.P. (e)
Western Machinery Co.....Shops.....208 H.P. (e)
Wilson & Co.....Packers....473½ H.P. (e)
Y. M. C. A. Hotel.....Hotel.....225 H.P. (e)

Macdoel—Pennsylvania Sash & Door Co.Doors.....220 H.P. (e)
Mare Island—U. S. Government.....Shops.....655 H.P. (e)
Marigold—Marysville Dredging Co....Dredging....659 H.P. (e)
Martel—Kennedy Milling & Mining Co.....295 H.P. (e)
Martinez—Mountain Copper Co.....Mine.....416 H.P. (e)
Maxwell—Compton Deleven Irrig. Dist.Irrigation...780 H.P. (e)
Marysville—Yuba Manufacturing Co...Dredging....666½ H.P. (e)
Merced—California Pottery Co.....Tile.....245 H.P. (e)
Merced Falls—Yosemite Lumber Co....Sawmill....603 H.P. (e)
Meridean—Reclamation District No. 70.Irrigation...550 H.P. (e)
Monrovia—Azusa Irrigation Co. Well No. 1.....Pumping....350 H.P. (e)
Azusa Irrigation Co. Well No. 2.....Pumping....450 H.P. (e)
City of Arcadia.....Pumping....335 H.P. (e)
City of Azusa.....Pumping....605 H.P. (e)
City of Sierra Madre.....Pumping....228 H.P. (e)
City of Monrovia.....Pumping....665 H.P. (e)
Glendora Consol. Mutual Irrigating Co.Pumping....350 H.P. (e)
La Puente Coop. Water Co.....Pumping....500 H.P. (e)
Santa Anita Rancho.....Pumping....410 H.P. (e)
So. Cal. Rock & Gravel Co.....Crusher....947½ H.P. (e)
Union Rock Co.....Crusher....1413 H.P. (e)
Union Rock Co.....Crusher....365 H.P. (e)
Valencia Heights Water Co.....Pumping....295 H.P. (e)
Mutual Irrigating Co.....Pumping....350 H.P. (e)

McCloud—McCloud River Lumber Co..Lumber.....970 H.P. (e)
Napa—Napa State Hospital.....Hospital....527 H.P. (e)
Sawyer Tanning Co.....Leather....749 H.P. (e)
Natomas—Natomas Cons. of California.Dredging....1660 H.P. (e)
Nicolaus—Reclamation District No. 1001.Irrigation...1330 H.P. (e)
Niles—California Brick Co.....Brick.....938 H.P. (e)
Oakland—Air Reduction Co.....Red. Wks....328 H.P. (e)
Albers Bros. Milling Co.....Cereals.....1300 H.P. (e)
American Manganese Steel Co.....Steel.....2000 H.P. (e)
American Rubber Mfg. Co.....Rubber.....300 H.P. (e)
Antiseptic Laundry.....Laundry....375 H.P. (i)
Atlas Imperial Engine Co.....Engines....245 H.P. (e)
E. E. Booth Co.....Cannery....235 H.P. (e)
Bruce Lumber Co.....Lumber.....320 H.P. (i)
Byron Jackson Iron Works.....Machinery...340 H.P. (e)
Calif. Compressed Gas Co.....Gas.....762 H.P. (e)
California Conserving Co.....Cannery....450 H.P. (e)
Calif. Corrugated Culvert Co.....Culverts....220 H.P. (e)
California Cotton Mills.....Textiles....4038 H.P. (e)
Calif. Door Co.....Doors.....1550 H.P. (s)
Calif. Ink Co.....Ink.....550 H.P. (e)
Calif. & Ore. Lumber Co.....Lumber.....431 H.P. (e)
California Pottery Co.....Pottery....325 H.P. (i)
Certainteed Products Co.....Roofing....1300 H.P. (e)
Coast Tire & Rubber Co.....Rubber Gds..800 H.P. (e)
Cowell Portland Cement Co.....Cement.....5860 H.P. (e)
Domestic Laundry.....Laundry....116 H.P. (i)
East Bay Water Co.....Pumping....1050 H.P. (i)
East Contra Costa Irrigation Co.....Irrigation....1285 H.P. (e)
Electro-Alkaline Co.....Chemicals....330 H.P. (e)
Giant Powder Co.....Powder.....558 H.P. (e)
Grangers Business Assn.....Food.....355 H.P. (e)
Great Western Electro-Chemical Co..Chemicals...3600 H.P. (e)
Hogan Lumber Co.....Lumber.....750 H.P. (e)
Hutchinson Co.....Lumber.....225 H.P. (e)

Idora Park Co	Amusement	325 H.P. (e)
King Coal Co	Coal	1761 H.P. (e)
Manasse Tanning Co	Leather	120 H.P. (i)
Moore Shipbuilding Co	Ships	10,816 H.P. (e)
National Ice & Cold Storage	Ice	600 H.P. (e)
National Metals & Chemical Co	Metals	200 H.P. (e)
New Method Laundry	Laundry	180 H.P. (i)
Oakland Paving Co	Paving	275 H.P. (e)
Pacific Coast Borax Co	Borax	650 H.P. (i)
Pacific Coast Shipbuilding Co	Ships	3000 H.P. (e)
Pacific Electric-Metals Co	Metals	4200 H.P. (e)
Pacific Guano & Fertilizer Co	Fertilizer	350 H.P. (e)
Paraffine Paint Co	Paints	1800 H.P. (e)
Peet Soap Co	Soap	486 H.P. (e)
Pioneer Rubber Works	Rubber	2500 H.P. (e)
Port Costa Water Co	Pumping	622 H.P. (e)
Port Costa Brick Co	Brick	421 H.P. (e)
Pullman Company	Shops	650 H.P. (e)
Sanitary Ice & Cold Storage Co	Ice	275 H.P. (e)
Shell Oil Co. of California	Oil	900 H.P. (e)
Standard Gas Engine Co	Gas Engines	301 H.P. (e)
Standard Oil Co	Oil	8900 H.P. (e)
Seedro Separator Co	Separators	600 H.P. (e)
Skandia Pacific Oil Engine Co	Engines	712 H.P. (e)
Stauffer Chemical Co	Chemicals	453 H.P. (e)
Sunset Lumber Co	Lumber	1500 H.P. (i)
Trojan Powder Co	Powder	350 H.P. (e)
Union Construction Co	Shops	1800 H.P. (e)
Union Oil Co	Oil	350 H.P. (e)
Union Water Co. (East Bay Water Co.)	Pumping	410 H.P. (e)
Vegetable Oil Corp	Oils	550 H.P. (e)
West Coast Kalsomine Co	Kalsomine	750 H.P. (e)
Western Milling Co	Milling	250 H.P. (e)
Western Pacific Railway	Shops	200 H.P. (e)
E. K. Wood Lumber Co	Lumber	825 H.P. (i)
U. S. Shipping Board	Shops	250 H.P. (e)
Oro Grande—Golden State Portland Cement Co	Cement	1833½ H.P. (e)
Oroville—American Gold Dredging Co	Dredging	360 H.P. (e)
American Gold Dredging Co	Dredging	408 H.P. (e)
Yukon Gold Co	Gold	1031 H.P. (e)
Patterson—Patterson Water Co	Pumping	2295 H.P. (e)
Perris—March Field	Shops	259¾ H.P. (e)
Moreno Water Co	Irrigation	290 H.P. (e)
Nuevo Water Co	Irrigation	425 H.P. (e)
Temescal Water Co	Irrigation	290 H.P. (e)
Petaluma—Camm & Hedges Co		233 H.P. (e)
Coulson Poultry Food Co	Feed	246 H.P. (e)
Petaluma Box Co	Boxes	233 H.P. (e)
Pittsburg—Columbia Steel Co	Steel	4391 H.P. (e)
Redwood Manufacturers Co	Lumber Prod.	2600 H.P. (s)
Plymouth—Plymouth Cons. Gold Mines	Mines	1610 H.P. (e)
Pomona—Covina Irrigation Co	Pumping	200 H.P. (e)
Indian Hill Citrus Assn	Ice	200 H.P. (e)
Laverne Orange Growers No. 1	Ice	200 H.P. (e)
Laverne Orange Growers No. 2	Ice	250 H.P. (e)
Pomona Valley Ice Co	Ice	200 H.P. (e)
San Dimas Orange Growers	Ice	200 H.P. (e)
Sanitary Laundry	Laundry	150 H.P. (e)
Union Ice Co	Ice	250 H.P. (e)
Princeton—Princeton-Codora-Glenn Irrig. Dist	Irrigation	900 H.P. (e)
Randsburg—California Rand Silver, Inc	Mines	931 H.P. (e)
Consolidated Salt Co	Mines	220 H.P. (e)
Yellow Aster Mining Co	Mines	516½ H.P. (e)
Redlands—Beaumont Irrigation District	Pumping	220 H.P. (e)
City of Colton—Well No. 1	Pumping	150 H.P. (e)
Well No. 3	Pumping	100 H.P. (e)
Rialto Ave	Pumping	100 H.P. (e)
City of Redlands	Pumping	945 H.P. (e)
City of Riverside	Pumping	750 H.P. (e)
Gage Canal Co	Pumping	530 H.P. (e)
Globe Grain & Milling Co	Milling	265 H.P. (e)
Gold Buckle Assn	Packers	200 H.P. (e)
Gold Buckle Assn	Pumping	125 H.P. (e)
Pacific Fruit Express	Refrigeration	1643 H.P. (e)
San Bernardino Ice & Precooling	Refrigeration	462½ H.P. (e)
So. Calif. State Hospital	Asylum	280 H.P. (e)
Western Heights Water Co	Pumping	290 H.P. (e)
South Mesa Water Co	Pumping	560 H.P. (e)
Yucapia Water Co. No. 1	Pumping	940 H.P. (e)
Redondo—General Chemical Mfg. Co	Chem. Mfg.	1280 H.P. (e)
Llewellyn Iron Works	Machinery	3000 H.P. (e)
Standard Oil Co	Pumping	3100 H.P. (e)
Torrance Glass Co	Factory	232 H.P. (e)
Union Tool Co	Factory	4500 H.P. (e)
Richmond—California Wine Assn	Winery	490 H.P. (e)
Healy Tibbetts Cons. Co	Quarry	353 H.P. (e)
Blake Bros	Quarry	416 H.P. (e)
Richmond Pressed Brick Co	Brick	323 H.P. (e)
Western Pipe & Steel Co	Pipe & Steel	311 H.P. (e)
Pacific Sanitary Porcelain Co	Porcelain	850 H.P. (e)
A., T. & Santa Fe Ry. Co	Shops	600 H.P. (e)
Riverside—California Portland Cement Co	Cement	9110 H.P. (e)
City of Riverside	Pumping	750 H.P. (e)
Riverside Vineyard Co	Irrigation	203 H.P. (e)
Riverside Portland Cement Co	Cement	7163 H.P. (e)
Sacramento—Buffalo Brewing Co	Brewing	208½ H.P. (e)
Cannon-Phillips Co		324 H.P. (e)
R. Carstensen		502 H.P. (e)
R. Carstensen		204 H.P. (e)
City of Roseville	Pumping	402 H.P. (e)
City of Sacramento	Pumping	1315½ H.P. (e)
Essex Lumber Co	Lumber	205 H.P. (e)
Henneuse Tractor Co	Tractors	200 H.P.
E. Clemens Horst Co	Packers	400 H.P. (e)
Libby, McNeill & Libby	Packers	400 H.P. (e)
Natomas Co. of California, No. 1	Dredging	1097½ H.P. (e)
Natomas Co. of California, No. 4	Dredging	925 H.P. (e)
Natomas Co. of California, No. 8	Dredging	1367 H.P. (e)
Natomas Co. of California, No. 10	Dredging	1355 H.P. (e)
Natomas Co. of California	Rock Crusher	1640 H.P. (e)
Phillips Rice Milling Co	Milling	592 H.P. (e)
State Capitol	Building	189½ H.P. (e)
Swanston & Son		265 H.P. (e)
Salinas—New Idria Mining Co	Mines	285 H.P. (e)
Spreckels Sugar Factory	Sugar	225 H.P. (e)
Nestles Food Co	Food Prod.	200 H.P. (e)
San Bernardino—A., T. & S. F. Railway	Shops	986½ H.P. (e)
Bly Bros. Stone Co	Quarry	230 H.P. (e)
Citizen's Land & Water Co	Pumping	770 H.P. (e)
City of Colton	Pumping	200 H.P. (e)
City Water Plant	Pumping	775 H.P. (e)
College of Medical Evangelists	Building	241 H.P. (e)
Fontana Farms Co	Irrigation	1375 H.P. (e)
Hanford Iron Works	Machinery	618 H.P. (e)
Hcle, W. J.	Irrigation	647½ H.P. (e)
Lytle Creek Water & Imp. Co	Irrigation	551½ H.P. (e)
No. Corona Land Co	Irrigation	380 H.P. (e)
River Highland Water Co	Irrigation	485 H.P. (e)
Southern California Ice Co	Ice	296 H.P. (e)
San Diego—Penson Lumber Co	Lumber	257 H.P. (e)
Globe Mills	Milling	150 H.P. (i)
Independent Stone Co	Stone	212 H.P. (e)
International Packing Co	Packers	306 H.P. (e)
Naval Air Station	Aero	483 H.P. (e)
Naval Radio Station	Radio	1292 H.P. (e)
Savage Tire Co	Tires	963 H.P. (e)
San Diego Oil Products Corp	Oil	620 H.P. (e)
Union Ice Co	Ice	381 H.P. (e)
U. S. Marine Base	Shops	435 H.P. (i)
San Francisco—Adler Sanatorium	Hospital	125 H.P. (i)
Allec, J	Cleaners	250 H.P. (i)
American Biscuit Co	Factory	250 H.P. (i) 225 H.P. (e)
American Smelters Securities Co	Smelter	2753 H.P. (e)
Anderson Bros. Planing Mill	Mill	200 H.P. (e)
Atlas Laundry	Laundry	150 H.P. (i)
Bateman, Wm		345 H.P. (e)
Bauer-Schweitzer Hop & Malt Co	Malt	271 H.P. (e)
Bemis Bag Co	Bags	301 H.P. (e)
Bollman Co	Cigars	300 H.P. (e)
Borden, I. L	Milk	405 H.P. (e)
Brandenstein, M. J	Coffee	695 H.P. (e)
Buckingham & Hecht	Leather	100 H.P. (i)
Calif. Baking Co	Bakery	204 H.P. (e)
Calif. Barrel Co	Barrels	250 H.P. (e)
Calif. Glue Works	Glue	375 H.P. (i) 85 H.P. (e)
Calif. Mill Co		286 H.P. (e)
Calif. Tallow Works	Tallow	130 H.P. (e)
Children's Hospital-Hahnemann Hosp	Hospitals	300 H.P. (i)
California Central Creameries	Creamery	200 H.P. (e)
Calif. Macaroni Co	Paste	394 H.P. (e)
Chronicle Bldg	Building	400 H.P. (e)
Coast Rock & Gravel Co	Rock	221 H.P. (e)
Consumers Ice Co	Ice	380 H.P. (i)
H. S. Crocker Co	Stationery	200 H.P. (i)
Dairy Delivery Co	Milk	280 H.P. (i) 67 H.P. (e)
Diamond Laundry	Laundry	150 H.P. (i) 65 H.P. (e)
Domestic Laundry	Laundry	150 H.P. (e)
Dyer Bros	Metal	520 H.P. (e)
Eagle Laundry	Laundry	150 H.P. (i)
Empire Planing Mill	Mill	270 H.P. (i)
Emporium	Dept. Store	680 H.P. (i)
Enterprise Bottling Co	Bottling	500 H.P. (i) 200 H.P. (e)
Fairmont Hotel	Hotel	300 H.P. (i)
Fishbeck Soap Co	Soap	400 H.P. (e)
Fleischmann & Co	Yeast	1000 H.P. (i) 650 H.P. (e)
Flood Building	Building	525 H.P. (i)
Ford Auto Co	Shops	900 H.P. (e)
Franklyn Hospital	Hospital	400 H.P. (i)
French Hospital	Hospital	300 H.P. (e)
Galland Laundry	Laundry	286 H.P. (i)
Gardella, L		550 H.P. (e)
Ghirardelli Co	Chocolate	932 H.P. (e)
Gladding, McBean Co	Brick	1080 H.P. (e)
Globe Grain & Milling Co	Cereals	802 H.P. (e)
Golden Gate Laundry	Laundry	250 H.P. (i)
Hardy, J. H		200 H.P. (e)
Haslett Warehouse Co	Warehouse	245 H.P. (e)
Hayes Park Laundry	Laundry	235 H.P. (i)
Hearst (S. F. Examiner) Building	Building	500 H.P. (i)
Hercules Powder Co	Powder	2432 H.P. (e)
Herring Mills, Vehl & Collins	Mill	150 H.P. (e)
Hind Estate		500 H.P. (e)
Holmes Planing Mill	Mill	100 H.P. (i) 75 H.P. (e)
Hooper Lumber Co	Lumber	200 H.P. (e)
Hoopers Mission Laundry	Laundry	150 H.P. (i)
Hotel Owners Laundry	Laundry	275 H.P. (i)
Hulme & Harte		120 H.P. (e)
Hunters Point Drydock	Drydock	1290 H.P. (i)
Illinois Pacific Glass Co	Glass	1350 H.P. (e)
Independent Laundry	Laundry	250 H.P. (i)
Jackson Brewery	Brewery	300 H.P. (e)
Judson Mfg. Co	Iron Prod.	3767 H.P. (e)
Kullman, Salz & Co	Leather	944 H.P. (e)
Kruse, J. H		212 H.P. (e)
LaGrande Laundry	Laundry	375 H.P. (i)
Lane Hospital	Hospital	320 H.P. (e)
Langendorf Baking Co	Bakery	220 H.P. (e)
Legallet, Helwig, Norton		575 H.P. (i)
Marine Hospital	Hospital	300 H.P. (i)
Mary's Help Hospital	Hospital	250 H.P. (i)
Merchants Exchange Bldg	Building	275 H.P. (i)
Merchants Ice & Cold Storage	Ice	4000 H.P. (e)
Metropolitan Laundry	Laundry	300 H.P. (i)
Miller & Lux	Packers	1570 H.P. (e)
Mills Building	Building	510 H.P. (i) 240 H.P. (e)
Musto Sons-Keenan Co	Marble	260 H.P. (e)
McGilvray Stone Co	Stone	315 H.P. (e)
National Brewing Co	Brewery	500 H.P. (i)
National Ice & Cold Storage	Ice	250 H.P. (i) 350 H.P. (DE)
Natomas Co. of California	Irrigation	1186 H.P. (e)
New Method Laundry	Laundry	200 H.P. (i)
New Process Laundry	Laundry	175 H.P. (i) 30 H.P. (e)
Nolan Mill & Feed Co	Feed	220 H.P. (e)
Nucoa Butter Co	Butter	310 H.P. (e)
Old Homestead Bakery	Bakery	375 H.P. (e)
Old Mission Portland Cement Co	Cement	2616 H.P. (e)
Olympic Baths	Baths	300 H.P. (i)
Pacific Box Factory	Boxes	400 H.P. (i) 260 H.P. (e)
Pacific Coast Glass Co	Glass	550 H.P. (e)
Pacific Coast Syrup Co	Syrup	230 H.P. (e)
Pacific Oil & Lead Co	Paints	862 H.P. (e)
Pacific Portland Cement Co	Cement	6857 H.P. (e)
Pacific Rice Mills	Rice	280 H.P. (e)
Pacific Rolling Mill Co	Mills	460 H.P. (e)
Palace Hotel	Hotel	1050 H.P. (i)
Phil. Veg. Oil Co	Oil	150 H.P. (i)
Poetsch & Peterson		390 H.P. (i) 35 H.P. (e)
Radio Corp. of America	Radio Sup	668 H.P. (e)
Rasmussen, John		150 H.P. (e)

Raymond Granite Co.	Stone	800 H.P. (e)
Reclamation District No. 108	Irrigation	3714 H.P. (e)
Rheinhart Lumber Co.	Lumber	130 H.P. (i)
Rosenberg Bros.	Packers	503 H.P. (e) 200 H.P. (i)
Roth Blum Packing Co.	Packers	200 H.P. (i) 100 H.P. (e)
San Francisco Dairy Co.	Dairy	260 H.P. (i) 200 H.P. (e)
San Francisco Pack. & Provis. Co.	Packers	160 H.P. (i) 150 H.P. (e)
San Francisco Hospital	Hospital	1000 H.P. (i)
San Francisco Laundry	Laundry	425 H.P. (i)
San Francisco Sulphur Co.	Chemicals	375 H.P. (i)
Sanitary Laundry	Laundry	275 H.P. (i)
Schmidt Lithograph Co.	Printing	535 H. P.(e)
Shrader Iron Works	Shops	350 H.P. (e)
Simmons Bed Co.	Beds	1380 H.P. (e)
Southern Pacific Building	Building	400 H.P. (i)
Southern Pacific Hospital	Hospital	200 H.P. (i)
Spring Valley Water Co.	Water	513 H.P. (e)
Spring Valley Water Co.	Pumping	250 H.P. (e)
Spring Valley Water Co.	Pumping	370 H.P. (e)
Spring Valley Water Co.	Pumping	590 H.P. (e)
Standard Shirt Factory	Factory	100 H.P. (i)
Stauffer Chemical Works	Chemicals	367 H.P. (e)
Stone, E. B. & A. L.	Contractors	1122 H.P. (e)
St. Francis Hospital	Hospital	400 H.P. (i)
Sterling Laundry	Laundry	250 H.P. (e)
St. Luke's Hospital	Hospital	250 H.P. (e)
St. Mary's Hospital	Hospital	300 H.P. (i)
Stuart Electro Oxo-Hydrogen Co	Chemicals	790 H.R. (e)
Sutro Baths	Baths	410 H.P. (i)
Troy Laundry	Laundry	600 H.P. (i)
Tubbs Cordage	Rope	500 H.P. (i) 67 H.P. (e)
Union Iron Works	Shipbuilding	1330 H.P. (i) 2545 H.P. (e)
University of California Hospital	Hospital	200 H.P. (i)
Wells Fargo Bldg	Building	200 H.P. (i)
Western Sugar Refinery	Refinery	6300 H.P. (e)
Wielands Brewery	Brewery	460 H.P. (e)
Windler, Geo., Mill	Mill	110 H.P. (i)
Yosemite Flour Mills	Flour	175 H.P. (i)
Y. M. C. A.	Building	375 H.P. (e)
San Pedro—General Pipe Line Co.	Oil	310 H.P. (e)
Kerckhoff Lumber Co.	Lumber	360 H.P. (e)
Van Camp Sea Food Co.	Cannery	230 H.P. (e)
Santa Ana—Irvine Ranch	Pumping	3270 H.P. (e)
Red Hill Water Co.	Pumping	675 H.P. (e)
Santa Ana Valley Irrig. Co.	Pumping	550 H.P. (e)
Santa Cruz—Santa Cruz Portland Cement Co.	Cement	10,967 H.P. (e)
Santa Monica—Fraser Million Dollar Pier	Amusement	236 H.P. (e)
Gilmore Oil Co.	Oil	308 H.P. (e)
Imperial Ice Co.	Ice	261½ H.P. (e)
Los Angeles Press Brick Co.	Brick	627 H.P. (e)
Rancho La Brea Oil Co.	Oil	555 H.P. (e)
Santa Monica Pleasure Pier	Amusement	236 H.P. (e)
Woods-Beekman Lumber Co.	Lumber	283 H.P. (e)
Santa Paula—Limoneria Co.	Pumping	360 H.P. (e)
Ventura Refinery	Oil	345 H.P. (e)
Santa Rosa—National Ice Co.	Ice	200 H.P. (e)
Selma—Calif. Assoc. Raisin Co.	Packers	236 H.P. (e)
Libby-McNiel & Libby	Canners	278 H.P. (e)
McGilvary Granite Co.	Granite	576 H.P. (e)
Raymond Granite Co.	Granite	475 H.P. (e)
Shingle Springs—Eldorado Lime & Materials Co.	Mining	254 H.P. (e)
Sisson—Pioneer Box Co.	Boxes	300 H.P. (e)
Stockton—California Delta Farms Inc.	Irrigation	2052 H.P. (e)
Harris Manufacturing Co.	Farm. Imp.	210 H.P. (e)
Holt Manufacturing Co.	Farm. Imp.	2550 H.P. (e)
Monarch Foundry	Shops	229 H.P. (e)
Monarch Foundry	Furnace	333 H.P. (e)
National Ice Co.	Ice	241 H.P. (e)
National Paper Products Co.	Paper	1410 H.P. (e)
Rindge Land & Navigation Co.	Irrigation	590 H.P. (e)
Sperry Flour Co.	Milling	992 H.P. (e)
Stockton F. & E. Brick Co.	Brick	381 H.P. (e)
Stockton Ice & Cold Storage Co.	Ice	400 H.P. (e)
Stockton Iron Works	Shops	327½ H.P. (e)
Stockton State Hospital	Hospital	202 H.P. (e)
Union Ice Co.	Ice	266 H.P. (e)
Union Ice Co.	Ice	251 H.P. (e)
Wagner Leather Co.	Leather	236 H.P. (e)
Sutter Creek—Central Eureka Mining Co.	Mines	1100 H.P. (e)
Trinity Center—Pacific Gold Dredging Co.	Dredging	648 H.P. (e)
Estavrook Gold Dredging Co.	Dredging	1000 H.P. (e)
Trona—American Trona Co.	Chemicals	2207 H.P. (e)
West End Chemical Co.	Chemicals	860 H.P. (e)
Vallejo—Sperry Flour Co.	Flour	2258 H.P. (e)
Van Nuys—Consumer's Rock & Gravel Co.	Crusher	310 H.P. (e)
Southern Pacific Railroad	Compressors	4399 H.P. (e)
Sterling Borax Co.	Mine	350 H.P. (e)
Universal Film Co.	Mov. Pict.	1000 H.P. (e)
Venice—Goldwyn Pictures Corp.	Mov. Pict.	360 H.P. (e)
Thos. H. Ince Co.	Mov. Pict.	330 H.P. (e)
Hal E. Roach Co.	Mov. Pict.	400 H.P. (e)
Ventura—Montalvo Water Co.	Pumping	210 H.P. (e)
Shell Oil Co.	Oil	225 H.P. (e)
Vernon—American Can Co.	Cans	454 H.P. (e)
American Encaustic Tiling	Tiling	694 H.P. (e)
A. T. & Santa Fe R. R.	Refrigerating	650 H.P. (e)
Axelson Machine Co.	Machinery	604½ H.P. (e)
Boyle Mfg. Co.	Iron Prod.	368 H.P. (e)
Calif. Compressed Gas Co.	Gas	734 H.P. (e)
Calif. Cotton Oil Co.	Oils	755 H.P. (e)
Calif. Oregon Paper Mills	Paper	874 H.P. (e)
Ganahl Lumber Co.	Lumber	252 H.P. (e)
General Petroleum Co.	Petroleum	750½ H.P. (e)
Globe Oil Mills	Oils	1886½ H.P. (e)
Globe Oil Mills	Pumping	355 H.P. (e)
Griffin Wheel Co.	Car Wheels	380½ H.P. (e)
Keystone Iron Works	Iron Prod.	2330½ H.P. (e)
Killefer Machine Co.	Machinery	230½ H.P. (e)
Leach Biltwell Motor Co.	Factory	212 H.P. (e)
Pacific Portable Cons. Co.	Houses	423½ H.P. (e)
Samson Tire & Rubber Co.	Tires	440 H.P. (e)
Southern Board & Paper Mills	Cardboard	1092 H.P. (e)
So. Cal. Iron & Steel Co.	Iron. Prod.	254½ H.P. (e)
South Los Angeles Water Co.	Pumping	270 H.P. (e)
Union Tank & Pipe Co.	Tanks-Pipes	255 H.P. (e)
Vitrefrax Co.	Brick	800 H.P. (e)
West Coast Kalsomine Co.	Paints	253 H.P. (e)
Whiting Mead Commercial Co.	Plumbing Supplies	308½ H.P. (e)
Whiting Mead Commercial Co.	Lumber	384½ H.P. (e)
Wilson & Willard	Tools	446 H.P. (e)
Warman Steel Castings Co.	Castings	1362½ H.P. (e)
Victorville—Southwestern Portland Cement Co.	Cement	2562½ H.P. (e)
Weed—Weed Lumber Co.	Lumber	2300 H.P. (e)
Whittier—City of Whittier	Pumping	765 H.P. (e)
Cross Land & Water Co.	Irrigation	215 H.P. (e)
Pacific Clay Products	Brick	215 H.P. (e)
West Coast Asbestos Co.	Asbestos Pr.	305 H.P. (e)
Whittier Extension Co.	Pumping	870 H.P. (e)
Willows—Provident Irrigation Co.	Irrigation	1000 H.P. (e)
Glenn Colusa Irrigation Dist.	Irrigation	3970 H.P. (e)
Yuma Ext.—Imperial Irrigation District	Irrigation	2349 H.P. (e)
Yuma Ice, Elec. & Mining Co.		666 H.P. (e)

COLORADO

Arvada—Denver Shale Brick Co.		150 H.P. (i)
Midwest Tire Co.	Tires	400 H.P. (e)
Avondale—Avondale Alfalfa M. & E. Co.	Mill	275½ H.P. (e)
Berthoud—Berthoud Farm Pr. Co.	Grain	100 H.P. (e)
Berthoud M. & E. Co.	Flour	125 H.P. (i)
Blende—U. S. Zinc Co.	Smelter	150 H.P. (e)
Boulder—Boulder M. & E. Co.	Flour	125 H.P. (i)
Brighton—Great Western Sugar Co.	Sugar	Over 100 H.P. (e)
Brookside—Vezzetti & Moschetti Coal Co.	Mines	120 H.P. (e)
Broomfield—Colorado Alfalfa Milling Co.	Milling	190 H.P. (e)
Brush—Great Western Sugar Co.	Sugar	Over 100 H.P. (e)
Canon City—Canon-Crystal Ice Co.	Ice	100 H.P. (i)
Canon-Reliance Coal Co.	Coal	977½ H.P. (e)
Diamond Fire Brick Co.	Brick	100 H.P. (i)
Empire Zinc Co.	Smelter	1200 H.P. (e)
Gibson Fuel Co.	Mines	225 H.P. (e)
Chandler—Victor-American Fuel Co.		
Radiant Mine	Mines	215 H.P. (e)
Chandler Mine	Mines	395 H.P. (e)
Coal Mine	Hoist	250 H.P. (i)
Cheraw—Denver Alfalfa Milling Co.	Milling	150 H.P. (e)
Colorado Springs—City Coal Mines, Pikes Peak Consol. Fuel Co., Keystone Mining Co.	Mines	Over 500 H.P. (e)
Golden Cycle Min. & Red. Co.	Milling	1000 H.P. (e)
Midland Terminal Railway Co.		600 H.P. (e)
Hassell Iron Works Co.	Iron Wks.	300 H.P. (e)
Western Mill Works Co.	Mill	150 H.P. (e)
Concrete—U. S. Portland Cement Co.	Cement	3692 H.P. (e)
Cripple Creek—Ajax Gold Mining Co.	Mines	800 H.P. (i)
Altman Water Co.	Mines	200 H.P. (e)
American Eagle Mine	Mines	200 H.P. (i)
Catherine Mining Co.	Mines	450 H.P. (e)
Colo. Springs & Int. Ry. Co.	Shops	205 H.P. (e)
Cresson Consolidated G. M. Co.	Mines	355 H.P. (e)
Cresson Consolidated G. M. Co.	Mines	600 H.P. (i)
Eagle Ore Co.	Mines	110 H.P. (e)
El Paso Consolidated G. M. Co.	Mines	150 H.P. (e)
Fish, Charles E.	Mining	105 H.P. (e)
Granite G. M. Co.	Mines	345 H.P. (e)
Kyner, Hall & Co.	Mines	105 H.P. (e)
Mary McKinney Mine Co.	Mines	110 H.P. (e)
Phoenix Deep Leasing Co.	Mines	107 H.P. (e)
Portland Gold Mining Co.	Milling	2864 H.P. (e)
Portland Gold Mining Co.	Pumping	309 H.P. (e)
Portland Gold Mining Co.	Mines	957 H.P. (e)
Portland Gold Mining Co.	Mines	1500 H.P. (i)
Teller County Air Co.	Chemical	425 H.P. (e)
Vindicator Consolidated G. M. Co.	Mines	1338 H.P. (e)
Vindicator Consolidated G. M. Co.	Mines	800 H.P. (i)
Crowley—Avondale Alfalfa Milling Co.	Milling	208 H.P. (e)
Twin Lakes Land & Inv. Co.	Irrigation	100 H.P. (e)
Denver—Ady & Crowe Merc. Co.	Flour	300 H.P. (e)
American Brake Shoe & Foundry Co.	Foundry	100 H.P. (e)
Armour Packing & Prov. Co.	Packers	1000 H.P. (i)
F. C. Ayers Merc. Co.	Flour	300 H.P. (e)
Beatrice Creamery Co.		600 H.P. (i)
W. A. Box Iron Works		200 H.P. (e)
Brecht Candy Co.	Candy	175 H.P. (e)
Burdett Oxygen Co.	Chemical	310 H.P. (e)
C. S. Card Iron Works	Iron	100 H.P. (e)
City Slag Crusher	Crusher	100 H.P. (e)
Climax Dairy	Dairy	100 H.P. (e)
Coffin Packing & Prov. Co.	Packers	200 H.P. (i)
Colfax Pressed Brick	Brick	160 H.P. (e)
Colorado Ice & Cold Storage Co.	Ice	1000 H.P. (e)
Colorado Iron Works	Iron	250 H.P. (i)
Colorado Laundry	Laundry	100 H.P. (i)
Colorado Lumber Co.	Lumber	100 H.P. (e)
Colorado Paper Co.	Paper	300 H.P. (e)
Colorado & Southern Railroad	Shops	400 H.P. (i)
Corbett Ice Cream Co.	Ice Cream	150 H.P. (e)
Crescent Flour Mills	Flour	400 H.P. (i)
Columbine Laundry	Laundry	200 H.P. (e)
Denver Elevator Co.	Elevators	100 H.P. (e)
Denver Fire Clay Co.	Brick	200 H.P. (e)
Denver Post	Newspaper	200 H.P. (e)
Denver Publishing Co.	Newspaper	140 H.P. (e)
Denver & Rio Grande R. R.	Shops	1200 H.P. (e)
Denver Ice & Cold Storage	Ice	250 H.P. (e)
Denver Rock Drill Co.	Machinery	1400 H.P. (e)
Denver Sewer Pipe & Clay Co.	Pipe	1000 H.P. (e)
Denver Terra Cotta Co.	Clay Prod.	350 H.P. (e)
Denver Union Water Co.	Pumping	1000 H.P. (i)
Farmers Mill & Elev. Co.	Grain	600 H.P. (i)
Gates Rubber Co.	Rubber Prd.	1500 H.P. (e)
Geddies & Serrie	Brick	150 H.P. (i)
General Iron Works	Iron	300 H.P. (e)
General Chemical Co.	Chemicals	1200 H.P. (e)
Griffen Wheel Co.	Wheels	1400 H.P. (e)
House of Good Shepherd	Laundry	225 H.P. (i)
Hungarian Mills	Milling	1000 H.P. (i)
Ideal Laundry	Laundry	150 H.P. (i)
Kindel, Geo. J.	Bedding	100 H.P. (i)
W. H. Kistler Stationery Co.	Stationery	100 H.P. (e)
Linde Air Products Co.	Chemicals	300 H.P. (e)

Lindquist Cracker Co.	Crackers	150 H.P. (e)	
Macklem Baking Co.	Bakery	150 H.P. (e)	
Magnus Metal Co.	Metal	100 H.P. (e)	
Merchants Biscuit Co.	Bakery	250 H.P. (e)	
Monarch Engineering Co.	Machinery	100 H.P. (e)	
Morey Mercantile Co.	Store	200 H.P. (e)	
Mountain States Packing Co.	Packers	250 H.P. (e)	
McMurtry Mfg. Co.	Factory	160 H.P. (e)	
Plains Iron Works	Iron	400 H.P. (e)	
Platte River Sand & Gravel Co.	Sand,Gravel	140 H.P. (e)	
Queen City Foundry	Foundry	1200 H.P. (e)	
Sayre-Newton Lumber Co.	Lumber	230 H.P. (i)	
Silver State Laundry	Laundry	150 H.P. (e)	
Smith-Brooks Printing Co.	Printing	170 H.P. (e)	
Swift & Co.	Packers	500 H.P. (i)	
Union Pacific R. R.	Shops	1200 H.P. (e)	
United States Mint	Mint	350 H.P. (e)	
Vulcan Iron Works	Iron	200 H.P. (e)	
Welsh-Haffner Press	Printing	150 H.P. (e)	
Western Steam Laundry	Laundry	160 H.P. (e)	
Windsor Farm Dairy	Dairy	200 H.P. (e)	
Excelsior Mills	Milling	150 H.P. (e)	
Ford Motor Co.	Shops	550 H.P. (e)	
Devine—Pueblo Alfalfa M. & E. Co.	Milling	200 H.P. (e)	
East Lake—Colorado Alfalfa Milling Co.	Milling	248 H.P. (e)	
Eaton—Great Western Sugar Co.	Sugar	Over 100 H.P. (e)	
Englewood—Superior Photoplay Co.	Mov. Pict.	150 H.P. (e)	
Florence—Continental Oil Co.	Refinery	130 H.P. (e)	
River Smelting & Ref. Co.	Smelter	592½ H.P. (e)	
United Oil Co.	Refinery	4500 H.P. (e)	
Fort Collins—Great Western Sugar Co.	Sugar	150 H.P. (e)	4200 H.P. (i)
Ft. C. M. & E. Co.	Milling	165 H.P. (e)	
Fort Lupton—Industrial Sugar Co.	Sugar	Over 100 H.P. (e)	
Fort Morgan—Great Western Sugar Co.	Sugar	Over 100 H.P. (e)	
Fowler—Colorado Alfalfa Mill & Power Co.	Milling	150 H.P. (i)	
Frederick—Baum Mine	Coal	100 H.P. (e)	500 H.P. (i)
Columbine Mine	Coal	780 H.P. (e)	
Evans Mine	Coal	130 H.P. (e)	350 H.P. (i)
Ft. Lupton Coal Co.	Coal	150 H.P. (i)	
Grant Mine	Coal	548 H.P. (e)	
Morrison Mine	Coal	350 H.P. (i)	
Eureka Mine	Coal	150 H.P. (i)	
McNeil Mine	Coal	300 H.P. (i)	
Puritan Mine	Coal	260 H.P. (e)	550 H.P. (i)
Russell Coal Co.	Coal	350 H.P. (i)	
Shamrock Mine	Coal	100 H.P. (e)	225 H.P. (i)
Slope Mine	Coal	300 H.P. (i)	
State Mine	Coal	215 H.P. (e)	400 H.P. (i)
White House Mine	Coal	240 H.P. (i)	
Gilcrest—Great Western A. M. Co.	Milling	128 H.P. (e)	
Golden—Adolph Coors Co.	Malt	250 H.P. (e)	
Colorado Collieries Co.	Coal	230 H.P. (e)	
Colorado School of Mines	Testing	125 H.P. (e)	
Golden Fire Brick Co.	Brick	220 H.P. (e)	
Grand Junction—Holly Sugar Corporation	Sugar	Over 100 H.P. (e)	
Red Lands Co.	Pumping	1200 H.P. (e)	
Greeley—Great Western Sugar Co.	Sugar	Over 100 H.P. (e)	
Kersey—Superior Alfalfa Milling Co.	Milling	150 H.P. (e)	
Kings Center—Pueblo Alfalfa Milling Co.	Milling	215 H.P. (e)	
Lafayette—Simpson Mine	Coal	130 H.P. (e)	550 H.P. (i)
Standard Mine	Coal	100 H.P. (e)	520 H.P. (i)
Vulcan Mine	Coal	300 H.P. (i)	
LaJunta—City of LaJunta	Pumping	175 H.P. (e)	
LaJunta Flour Mill	Flour	125 H.P. (i)	
LaJunta Clay Products	Clay Prod	175 H.P. (i)	
Intermountain Ry., Light & Power Co.	Ice	325 H.P. (i)	
La Salle—Superior Alfalfa Milling Co.	Milling	150 H.P. (e)	
Littleton—Brookridge Dairy Farm	Dairy	100 H.P. (e)	
Leyner Engineering Works	Machinery	600 H.P. (e)	
Longmont—Empson Canning Co.	Cannery	110 H.P. (e)	160 H.P. (i)
Farmers Union Coop. Mill	Flour	150 H.P. (e)	
Great Western Sugar Co.	Refinery	4000 H.P. (i)	
Longmont Farmers Mill	Flour	150 H.P. (e)	135 H.P. (i)
Longmont Flour Mill	Flour	150 H.P. (i)	
Louisville—Acme Mine	Coal	130 H.P. (e)	400 H.P. (i)
Black Diamond Coal Co.	Coal	250 H.P. (i)	
Centennial Mine	Coal	225 H.P. (e)	300 H.P. (i)
Industrial Mine	Coal	150 H.P. (e)	450 H.P. (i)
Matchless Mine	Coal	117 H.P. (e)	280 H.P. (i)
Monarch No. 2 Mine	Coal	130 H.P. (e)	300 H.P. (i)
Loveland—Great Western Sugar Co.	Refinery	4000 H.P. (i)	
Loveland Fruit Pr. Co.	Cannery	100 H.P. (i)	
Loveland M. & E. Co.	Flour	125 H.P. (i)	
U. S. Gypsum	Cement	236 H.P. (e)	
Manitou—Western Lime Co.	Lime Prod	400 H.P. (e)	
Manzanola—Beaty Merc. Co.	Milling	165 H.P. (e)	
Marshall—Crown Fuel Co.	Coal	112 H.P. (e)	200 H.P. (i)
Fox Mine	Coal	100 H.P. (e)	300 H.P. (i)
Gorham Mine	Coal	819 H.P. (e)	
Mead—Great Western A. M. Co.	Milling	106 H.P. (e)	
Niwot—Denver Alfalfa M. Co.	Milling	187 H.P. (e)	
Numa—Avondale Alfalfa M. Co.	Milling	180 H.P. (e)	
Ordway—Colo. Alfalfa M. Co.	Milling	250 H.P. (i)	
Portland—Colo. Portland Cement Co.	Cement	4000 H.P. (i)	
Pueblo—American Smelt. & Ref. Co.	Smelter	200 H.P. (e)	
Colorado Fuel & Iron Co.	Steel Prod	10,000 H.P. (i)	
Colorado Laundry	Laundry	100 H.P. (i)	
Denver & R. G. R. R. Co.	Shops	253 H.P. (e)	
Elliott Frog & Switch Co.	Frogs-Switches	250 H.P. (e)	
Fountain Sand & Gravel Co.	Sand-Gravel	115 H.P. (e)	
Mountain Ice & Coal Co.	Ice	100 H.P. (i)	
McClelland Merc. Co.	Milling	105 H.P. (e)	
Nuckolls Packing Co.	Packers	257½ H.P. (e)	
Pueblo M. & E. Co.	Flour	229 H.P. (e)	
Pueblo Water Works	Pumping	958 H.P. (e)	
Standard Fire Brick Co.	Brick	235 H.P. (e)	
State Asylum	Sanitarium	150 H.P. (i)	
Roberts—Colo. Alfalfa Mill & Power Co.	Milling	137 H.P. (e)	
Rockvale—Colorado Fuel & Iron Co.			
Coal Creek Mine	Coal	717 H.P. (e)	
Emerald Mine	Coal	105 H.P. (e)	
Fremont Mine	Coal	403 H.P. (e)	
Rockvale Mine	Coal	445 H.P. (e)	
Rocky Ford—American Beet Sugar Co.	Sugar	2200 H.P. (i)	
City of Rocky Ford	Pumping	130 H.P. (e)	
Polar Ice & Storage Co.	Ice	125 H.P. (i)	
Severance—Great Western Alfalfa Milling Co.	Milling	128 H.P. (e)	
Silverton—Sunnyside Mining Co.	Mines	3600 H.P. (e)	
Tomboy Gold Mining Co.	Mines	1800 H.P. (e)	
Sterling—Great Western Sugar Co.	Refinery	Over 100 H.P. (e)	
Sugar City—National Sugar Co.	Sugar	800 H.P. (e)	
Stone City—Turkey Creek Stone Co.	Quarries	115 H.P. (e)	
Swink—Holly Sugar Corporation	Sugar	1000 H.P. (e)	
Telluride—Atlas M. & M.	Mines	315 H.P. (e)	
Belmont-Wagner	Mines	885 H.P. (e)	
Camp-Bird	Mines	165 H.P. (e)	
Colorado Superior	Mines	300 H.P. (e)	
Colorado Vanadium Corp.	Mines	355 H.P. (e)	
Liberty Bell Gold Mining Co.	Mines	1300 H.P. (e)	
Matterhorn M. & M. Co.	Mines	100 H.P. (e)	
Mountain Top Mining Co.	Mines	185 H.P. (e)	
Smuggler Union	Mines	1500 H.P. (e)	
Vroman—Silver State Alfalfa Mill. Co.	Milling	265 H.P. (e)	
Wellington — Great Western Alfalfa Milling Co.	Milling	125 H.P. (e)	
Wilson—Broadacres Farm Co.	Milling	150 H.P. (e)	
Windsor—Great Western Sugar Co.	Refinery	2124 H.P. (i)	
Windsor M. & E. Co.	Flour	125 H.P. (i)	

IDAHO

Barber—Boise-Payette Lumber Co.	Lumber	1575 H.P. (e)	
Boise—Boise Cold Storage Co.	Storage	400 H.P. (e)	C
Boise Stone Co.	Stone	462 H.P. (e)	C
Caldwell Mill & Elevator Co.	Mill	200 H.P. (e)	
Gem Irrigation District	Irrigation	7000 H.P. (e)	
Snake River Irrigation District	Irrigation	2250 H.P. (e)	
Burley—Burley Brick & Sand Co.		100 H.P. (e)	
Burley Feed & Mfg. Co.		185 H.P. (e)	
Burley Mill & Elevator Co.		160 H.P. (e)	
Caldwell—Caldwell Flour Mills	Flour	177 H.P. (e)	F
Hamer—Hamer Canal Co.	Irrigation	100 H.P. (e)	
Idaho Falls—Falk American Potato Flour Corporation	Flour	120 H.P. (e)	
Mud Lake Canal Co.	Irrigation	100 H.P. (e)	
Kellogg—Bunker Hill & Sullivan Mining & Con. Co.	Mining	6409 H.P. (e)	
Coeur d'Alene Syn. Min. Co.	Mining	169 H.P. (e)	
Leadore—Sunset Mining Co.	Mining	181 H.P. (e)	
Lewiston—City of Lewiston	Pumping	Over 100 H.P. (e)	
Cramer, H. L. Co.		Over 100 H.P. (e)	
Indian Chief Ranch		Over 100 H.P. (e)	
Lewiston Milling Co.	Milling	Over 100 H.P. (e)	
Nasberte Roller Mills	Milling	Over 100 H.P. (e)	
Mullan—Gold Hunter Mine	Mining	1210 H.P. (e)	
Mullan Mining Co.	Mining	271 H.P. (e)	
Nampa—Carnation Milk Products	Milk	165 H.P. (e)	F
Paris—Western Phosphate Mining Co.	Mines	340 H.P. (e)	
Pocatello—Pocatello Provision & Packing Co.	Meat	150 H.P. (e)	
Roberts—Owsley Canal Co.		375 H.P. (e)	
Terreton—Matkins Operating Co.		750 H.P. (e)	
Twin Falls—Amalgamated Sugar Co.	Sugar	450 H.P. (e)	
Twin Falls Mill & Elevator Co.	Flour	250 H.P. (e)	F
Wallace—Big Creek Mining Co.	Mining	157 H.P. (e)	
Chicago Boston Mining Co.	Mining	179 H.P. (e)	
Hecla Mining & Milling Co.	Mining	2166 H.P. (e)	
Weiser—Weiser Mill & Elevator Co.		280 H.P. (e)	

MONTANA

Anaconda—Washoe Smelter A. C. M.	Smelter	57,240 H.P. (e)	
Basin-Boulder—Alta Montana Mining Co.	Mining	350 H.P. (e)	
Butte—Algadore	Mining	100 H.P.	
Barnes-King Development	Mining	620 H.P. (w)	
Bell, Butte Hoise, Colorado, High Ore, Leonard, Original, Neversweat, Rarus	Mining	43,628 H.P. (e)	
Butte Metals Mining Co.	Mining	832 H.P. (e)	
Butte & Plutus	Mining	127 H.P. (e)	
Butte Reduction Works	Mining	100 H.P.	
Butte & Superior	Mining	13,629 H.P. (e)	
Colorado Shaft & Hibernia, Davis-Daly Co.	Mining	1550 H.P. (e)	
Crystal Copper Co.	Mining	160 H.P. (e)	
Davis-Daly Copper Co.	Mining	2380 H.P. (e)	
East Butte Copper Mining Co.	Smelting	4763 H.P. (e)	
Elm Orlu	Mining	2485 H.P. (e)	
Gem-Spec. Granite Mt. N. P.	Mining	3360 H.P. (e)	
Harrison Ave. Pumps	Pumping	370 H.P. (e)	
Legal Tender	Mining	150 H.P. (e)	
Mines Operating Co.	Mining	250 H.P. (e)	
Moulton	Mining	400 H.P. (e)	
Nettie	Mining	440 H.P. (e)	
Orphan Girl	Mining	150 H.P. (e)	
Precipitating Plants	Mining	290 H.P. (e)	
J. C. Pyle	Mining	465 H.P. (e)	
Sarsfield, Woodville Tunnel	Mining	1037 H.P. (e)	
Timber Butte Mill	Mining	3100 H.P. (e)	
Travonia	Mining	655 H.P. (e)	
Tuolumne	Mining	847 H.P. (e)	
Washoe Sampler A. C. M.	Mining	167 H.P. (e)	
Clancy—Economy	Mining	250 H.P. (e)	
Liverpool Silver	Mining	242 H.P. (e)	
Corbin—Alta Consol. Mining Co.	Mining	350 H.P. (e)	
S. L. Bright	Mining	150 H.P. (e)	
Merritt & Coston	Mining	150 H.P. (e)	
East Helena—E. Helena Smelter A. S. & R.	Smelter	3082 H.P. (e)	F
Great Falls—Anaconda Copper Mining Co.	Smelter	7600 H.P. (e)	
Electro Refining B. & M.	Mining	9916 H.P. (e)	
Ferro-Manganese B. & M.	Mining	37,730 H.P. (e)	
Smelter B. & M. Co.	Mining	6161 H.P. (e)	
Zinc Plant	Mining	56,905 H.P. (e)	
Lehigh—Cottonwood Coal Co.	Mining	1142 H.P. (e)	
Logan—Story Rock	Mining	235 H.P. (e)	
Marysville—Piegan-Gloster, Shannon, Tower Templeton	Mining	630 H.P. (e)	
Neihart—Cascade Consol. Mines	Mining	970 H.P. (e)	
Flohart Silver Mines Co.	Mining	140 H.P. (e)	
Neihart Consol. Silver Mines	Mining	115 H.P. (e)	
Norris—Revenue	Mining	220 H.P. (e)	
Phillipsburg—Scratchawl	Mining	133 H.P. (e)	
Phillipsburg Mining Co.	Mining	1166 H.P. (e)	
Race Track—Butte Jardine (Champion)	Mining	155 H.P. (e)	
Rocker P. O. Silver Bowl—Rocker A. C. M.	Mining	175 H.P. (e)	

Roundup—Independent Mining Co. Mining 100 H.P. (e)
Republic Coal Mining Co. No. 2-4 Mining 1165 H.P. (e)
Roundup Coal Mining Co. Mining 1778 H.P. (e)
Ruby—Conrey Placer Mining 3396 H.P. (e)
Sand Coulee—National Coal Co., Pierce Coal Co. Mining 933 H.P. (e)
Sheridan—Investors Co., Gladstone Mining Co. Mining 370 H.P. (e)
Sildix—Amazon Dixie Mining 100 H.P. (e)
Stockett—Cottonwood Coal Co. Mining 1252 H.P. (e)
Troy—Snowstorm Mines Mining 510 H.P. (w)
Walkerville—Goldsmith Mines Mining 160 H.P. (e)

NEVADA

Dayton—Carson River Mills Mining 110 H.P. (e)
Gold Canyon Dredging Co. Dredging 520 H.P. (e)
Goldfield—Florence Goldfield Mining Co. Mining 321 H.P. (e)
Goldfield Consol. Mining Co. Mining 945 H.P. (e)
New California Tonopah Mining Co. Mining 155 H.P. (e)
North Star Tunnel & Dev. Co. Mining 130 H.P. (e)
Rescue Eula Mining Co. Mining 223 H.P. (e)
Round Mountain Mining Co. Mining 245 H.P. (e)
Las Vegas—Union Pacific Co. Over 100 H.P. (e)
Lovelock—Rochester Mines-Mill Milling 316 H.P. (e)
Ludwig—Nevada Consol. Copper Co. Mining 967 H.P. (e)
Mason—Bluestone Mfg. & Smelt. Co. 1000 H.P. (e)
McGill—Nevada Consol. Copper Co. Mining Over 100 H.P. (e)
Mina—Simon Mining Co. Mining Over 100 H.P. (e)
Mound House—Pacific Portland Cement Co. Cement 480 H.P. (e) F
Reno—Crown Willamette Paper Co. 372 H.P. (e)
Gold Canyon Dredging Co. Dredging 312 H.P. (e)
Nevada Douglas Cons. Copper Co. Mining 107 H.P. (e)
Pacific Fruit Express Co. Refrigerating 122 H.P. (e)
Southern Pacific Co. Shops 151 H.P. (e)
Standard Metals Co. Mining 105 H.P. (e)
United Comstock Mines Co. Mining 692 H.P. (e)
Rochester—Nevada Packard Mines Co. Mining 302 H.P. (e)
Rochester Mines Mining 255 H.P. (e)
Sparks—Southern Pacific Co. Shops Over 100 H.P. (e)
Thompson—Mason Valley Mines Mining 150 H.P. (e)
Mason Valley Mines Smelting 2000 H.P. (e)
Tonopah—Divide Extension Mining Co. Mining 138 H.P. (e)
Gold Zone Mining Co. Mining 133 H.P. (e)
Halifax Tonopah Mining Co. Mining 1935 H.P. (e)
Montana Mining Co. Mining 285 H.P. (e)
McNamara Mining & Mill. Co. Mining 714 H.P. (e)
Tonopah Divide Mining Co. Mining 450 H.P. (e)
Tonopah Mining Co. Mining Over 100 H.P. (e)
Tonopah Belmont Mining Co. Mining 5365 H.P. (e)
Tonopah Extension Mining Co. Mining 6816 H.P. (e)
West End Cons. & Halifax Tonopah Min. Co. Mining 1935 H.P. (e)
Virginia City—Comstock Leasing Co. (Mill). Milling 315 H.P. (e)
Comstock Phoenix Mining 102 H.P. (e)
Comstock Pumping Assn. Mining 1630 H.P. (e)
Yerington—Walker River Copper Co. Mining 270 H.P. (e)

OREGON

Airlie—Davis & Weber Lumber 140 H.P. (s)
Albany—Red Crown Mills Flour 30 H.P. (e) 75 H.P. (w)
R. Veal & Sons Chairs 131¼H.P.(e) 100H.P.(s)
Algoma—Algoma Lumber Co. Lumber 780 H.P. (s) D
Alpine—Alsea River Lumber Co. Sawmill 1060 H.P. (s)
Astoria—Astoria Box Co. Boxes 800 H.P. (s) C
Astoria Flouring Mills Co. Flour 340 H.P. (e)
Astoria Flouring Mills Co. Flour 250 H.P. (e)
Astoria Lumber Co. Sawmill 400 H.P. (s)
Astoria Marine Iron Works Foundry 100 H.P. (e)
Booth Fisheries Co. Packers 20H.P.(e) 150H.P.(s) F
Clatsop Lumber Mills Sawmills 247H.P.(e) 80H.P.(s) F
Columbia River Packers Assn. Packers 114H.P.(e) 465H.P.(s) F
Hammond Lumber Co. Sawmill 3550H.P.(e) 2200H.P.(s) F
S. Schmidt & Co. Packers 15H.P.(e) 100H.P.(s) C
Union Fisherman's Coop. Pkg. Co. Canners 100H.P.(e) 140H.P.(s) D
Austin—Wm. H. Eccles Lumber Co. Sawmill 400 H.P. (s) D
Oregon Lumber Co. Sawmill 600 H.P. (s)
Baker—Baker Mill & Grain Co. Flour 100 H.P. (e) C
Baker White Pine Lumber Co. Sawmill 210H.P.(e) 950H.P.(s) E
Wm. H. Eccles Lumber Co. Sawmill 250 H.P. (s) D
Oregon Lumber Co. Sawmill 300 H.P. (s) F
Stoddard Lumber Co. Sawmill 50H.P.(e) 634H.P.(s) D
Bandon—Moore Mill & Lumber Co. Sawmill 800 H.P. (s) C
Nestles Food Co., Inc. Milk 117 H.P.(e) 350H.P.(s)
Banks—Mitchell Lumber Co. Lumber 150 H.P. (s)
Murphy Timber Co. Sawmill 250 H.P. (s) D
Bay City—Alley Lumber Co. Lumber 160 H.P. (s)
Beaver Hill—Beaver Hill Coal Co. Mine 200H.P.(e) 600H.P.(s)
Beaverton—Oregon Brick & Tile Co. Brick 100 H.P. (s)
Bend—Brooks-Scanlon Lumber Co. Sawmill 150 H.P. (e) 1750 (s) F
Shevlin-Hixon Lumber Co. Sawmill 1850 H.P.(e) 1750(s) F
Betzen—Monroe Shingle Co. Shingles 150 H.P. (s)
Birkenfield—Guistina Bros. Sawmill 120 H.P. (s)
Bourne—E. & E. Mine Mine 200 H.P. (e)
Brighton—Brighton Mills Co. Sawmill 200 H.P. (s) D
Brookings—California & Oregon Lumber Co. Sawmill 20H.P.(e) 1515 H.P.(s) E
Cake—Rainbow Mine Mill 300 H.P. (e)
Cameron Spur—Bull Run Line—Cameron-Hogg Lumber Co. Planing 100 H.P. (s)
Carlton—Carlton Cons. Lumber Co. Lumber 250 H.P. (e)
Cascade Locks—Wind River Lumber Co. Lumber 928H.P.(e) 600H.P.(s) F
Cherry Grove—Haskell-Carpenter Co. Sawmill 150 H.P. (s) C
Chiloquin—Chiloquin Lumber Co. Sawmill 300 H.P. (s) C
Clatskanie—Kratz Shingle Co. Shingles 135 H.P. (s)
Rice & Pulliam Sawmill 150 H.P. (s)
Coalca—Doernbecher Mfg. Co. Sawmill 125 H.P. (s)
Cochran—Douty Lumber Co. Lumber 900 H.P. (s)
C. H. Wheeler Estate Lumber 600 H.P. (s)
Comstock—Harvey Lumber Co. Sawmill 125 H.P. (s)
Coquille—Coquille Lumber Mills Sawmill 800 H.P. (e) 325 H.P.(s) C
E. E. Johnson Lumber Co. Sawmill 330 H.P. (e) 150 H.P. (s)
Cornucopia—Cornucopia Mines Co. Mills 665 H.P. (e) 1275 H.P. (w)
Gold Reef Mining Co. Mills 150 H.P. (w)
Corvallis—Corvallis Lumber Co. Lumber 375 H.P. (s)
Corvallis Sand & Gravel Co. Gravel 145 H.P. (e)
Fischer Flouring Mills, Inc. Flour 95 H.P. (e) 100 H.P. (w) D
Cottage Grove—Western Lumber & Export Co. Sawmill 300 H.P. (s) C
Curtin—Pioneer Lumber Co. Sawmill 115 H.P. (s)
Dallas—California Packing Co. Packers 28 H.P. (e) 80 H.P. (s)
Hamilton Lumber Co. Sawmill 100 H.P. (e)
Willamette Valley Lumber Co. Sawmill 1535 H.P. (e) 175 H.P. (s) E
John Day—Empire Gold Dredging & Mining Co. Dredging 290 H.P. (e)
Dee—Oregon Lumber Co. Sawmill 600 H.P. (e) 260 H.P. (s) F
Devitt—James Cole Sawmill 120 H.P. (s)
Dexter—Lost Valley Lumber Co. Lumber 120 H.P. (s)
Donald—Hoskins & DeSart Brick 150 H.P. (s)
Dorena—Bohemia Lumber Co. Lumber 300 H.P. (s) D
Enterprise—East Oregon Lumber Co. Sawmill 1200 H.P. (s) F
Hackbarth Mill Sawmill 100 H.P. (s)
Eugene—Eugene Woolen Mill Co. Textiles 100 H.P. (e) 125 H.P.(w) C
Fall Creek—Lane County Lumber Co. Lumber 100 H.P. (s)
Falls City—Falls City Lumber & Logging Co. Sawmill 600 H.P. (s) C
Griswold & Grier Lumber Co. Sawmill 110 H.P. (s) 30 H.P. (w)
Forest Grove—Carnation Milk Products Co. Milk 200 H.P. (e) 450 H.P. (s)
Gardiner—W. F. Jewett Investment Co. Sawmill 400 H.P. (s) E
Glendale—Glendale Lumber Co. Sawmill 40 H.P. (e) 325 H.P. (s) C
Lystul & Lawson Lumber Co. Sawmill 100 H.P. (e) 100 H.P. (s)
Pacific Western Lumber Co. Sawmill 135 H.P. (s)
Glenwood—Aagaard Lumber Co. Lumber 175 H.P. (s)
Goble—Warren Packing Co. Ice 100 H.P. (s)
Gold Hill—Beaver Portland Cement Co. Cement 2195 H.P. (e)
Granite—Harrison Mining Co. Mill 180 H.P. (e)
United Gold Mining Co. Mill 140 H.P. (e)
Grants Pass—Pine Box Co. Boxes 180 H.P. (s)
Gypsum—Acme Cement Plaster Co. RockCrusher 695 H.P. (e) F
Pacific Lime & Gypsum Co. Gypsum 800 H.P. (e)
Haines—National Mines Co. Mill 322 H.P. (e)
Halfway—Cornucopia Mines Silver 700 H.P. (e)
Harrisburg—Harrisburg Lumber & Mfg. Co. Sawmill 150 H.P. (e)
Hillsboro—G. H. P. Lumber Co. Lumber 125 H.P. (s)
Homestead—Homestead Iron Dyke Mines Quartz Mill. 771 H.P. (e)
Huntingron—Pacific Lime & Gypsum Co. Gypsum 310 H.P. (e)
Imbler—Imbler Box & Lumber Co. Boxes 208 H.P. (e)
Island City—Pioneer Flouring Mill Co. Flour 75 H.P. (e) 75 H.P. (w)
Joseph—Dawson Bros. Lumber Co. Planing 100 H.P. (s) 75 H.P. (w)
Kings Valley—S. A. Foster Lumber Co. Sawmill 400 H.P. (s) E
Kings Valley Lumber Co. Sawmill 180 H.P. (s)
Klamath Falls—Ackley Bros. Sawmill 67½H.P.(e) 80 H.P. (s)
Big Basin Lumber Co. Sawmill 260 H.P. (e) F
Big Lakes Box Co. Boxes 492 H.P. (e) 80 H.P. (s)
Geo. Christy Lumber 150 H.P. (s)
Ewauna Box Co. Boxes 975 H.P. (e) D
Klamath Lumber & Box Co. Boxes 1193 H.P.(e) 300 H.P.(s) C
Pelican Bay Lumber Co. Sawmill 1500 H.P. (s) E
Shaw-Bertram Lumber Co. Sawmill 200 H.P. (e) 75 H.P. (s) C
White Pine Lumber Co. Sawmill 100 H.P. (s)
Koler—Stevenson Lumber Co. Sawmill 150 H.P. (s)
Lagrande—Geo. Palmer Lumber Co. Boxes 1250 H.P. (s) F
Langell—Langell Lumber Co. Lumber 100 H.P. (s)
Lebanon—Crown Willamette Paper Co. Paper 175 H.P. (e) 1030 H.P. (s) F
Leona—Leona Mills Lumber Co. Planer 250 H.P. (s)
McMinnville—McMinnville Planing Mill Doors 100 H.P. (s) F
Nestles Food Co. Milk 130.7 H.P. (e)
Mabel—Coast Range Lumber Co. Lumber 1100 H.P. (s)
Marcola—Fisher Lumber Co. Sawmill 150 H.P. (s) C
Marshfield—Coos Bay Lumber Co. Sawmill 5640 H.P. (e) 5200 H.P. (s) 100 H.P. (w)
Coos Veneer & Box Co. Veneer 212 H.P. (e) 60 H.P. (s)
Marshfield Mill & Timber Co. Planer 250 H.P. (e)
Moore Shingle Mill Shingles 122 H.P. (e)
Oregon Export Lumber Co. Sawmill 115 H.P. (e) 300 H.P. (s) C
Western Lumber Mfg. Co. Veneer 345 H.P. (e) 160 H.P. (s)
Mayger—Fluhrer Bros. Shingles 175 H.P. (s)
Medford—J. T. Gagnon Boxes 159 H.P. (e)
So. Oregon Lumber Co. Sawmill 132 H.P. (e) 225 H.P. (s)
Tomlin Box Co. Boxes 315 H.P. (e)
Mill City—Hammond Lumber Co. Sawmill 320 H.P. (e) 1680 H.P. (s) 455 H.P. (w) F
Hill & Cramer Shingle Co. Shingle 100 H.P. (s)
Milton—Bardell Lumber & Box Co. Boxes 147 H.P. (e) 75 H.P. (s)
Milton Box Co. Boxes 116 H.P. (e)
Milwaukee—California Barrel Co. Barrels 130 H.P. (e) 250 H.P. (s)
Menefee Lumber Co. Shingles 275 H.P. (s)
Minam—Minam Lumber Co. Sawmill 250 H.P. (s) C
Modoc Point—Lamm Lumber Co. Sawmill 280 H.P. (s)
Modoc Lumber Co. Lumber 260 H.P. (s)
Mohawk—Mohawk Lumber Co. Lumber 260 H.P. (s) D
Mulino—Hult Lumber Co. Sawmill 115 H.P. (s)
Myrtlepoint—Aason & Schroder Lumber Co. Sawmill 120 H.P. (s)
Newberg—Chas. K. Spaulding Logging Co. Silos 87½ H.P. (e) 700 H.P. (s) F
North Bend—Bay Park Lumber Co. Sawmill 300 H.P. (e) 400 H.P. (s)
Buehner Lumber Co. Sawmill 650 H.P. (e) 1100 H.P.(s) F
North Bend Mill & Lumber Co. Sawmill 425 H.P. (e) 640 H.P. (s)
Willamette Pacific Lumber Co. Lumber 115 H.P. (e) 250 H.P. (s) C
North Powder—Jacobs & Hess Lumber Co. Boxes 85 H.P. (e) 185 H.P. (s)
Oregon City—Crown Willamette Paper Co. Paper 6711 H.P. (e) 3590 H.P. (s) 3500 H.P. (w) F
Hawley Pulp & Paper Co. Paper 2002 H.P. (e) 2105 H.P. (s) 9598 H.P. (w) F
Oregon City Mfg. Co. Clothing 125 H.P. (e) 550 H.P. (w) D
Williamette River Lumber Co. Planer 400 H.P. (s)
Oswego—Oregon Iron & Steel Co. Foundry 100 H.P. (e) C
Oregon-Portland Cement Co. Cement 1134 H.P. (e)
Pendleton—Collins Flour Mills Flour 215 H.P. (e) D
Pendleton Roller Mills Flour 225 H.P. (e) 300 H.P. (w) F
Frederick Walters Flour 150 H.P. (e) 200 H.P. (w) C
Perry—Grande Ronde Lumber Co. Sawmill 600 H.P. (s) F
Philomath—Siletz Spruce Co. Planing 165 H.P. (e)
Portland—Aladdin Co. Houses 367 H.P. (e) F
Albers Bros. Milling Co. Cereals 500 H.P. (e)
Albina Engine & Machine Works Machinery 200 H.P. (e) D
Albina Mills Flour 350 H.P. (e) F
American Can Co. Cans 150 H.P. (e) F
American Laundry Co. Laundry 125 H.P. (s)
Amer. Mar. Iron Works Foundry 200 H.P. (e)
Associated Oil Co. Oil 12 H.P. (e) 216 H.P. (s)

Barnes-Lindsley Mfg. Co.	Crossarms	150 H.P. (s)	
Benson Hotel	Hotel	600 H.P. (s)	
Bridal Veil Lumbering Co.	Sawmill	1200 H.P. (s) 900 H.P. (w)	F
Burlington Lumber Mill	Lumber	270 H.P. (s)	
Cameron-Hogg Lumber Co.	Sawmill	150 H.P. (s)	C
Carman Mfg. Co.	Furniture	500 H.P. (e) 150 H.P. (s)	F
Central Door & Lumber Co.	Doors	369½ H.P. (e)	
Champion Mfg. Co.	Cabinets	200½ H.P. (e)	
Clark-Wilson Lumber Co.	Planer	300 H.P. (e) 1200 H.P. (s)	
Closset & Devers	Baking Pwdr.	133½H.P. (e)	D
Columbia Brick Works	Brick	100 H.P. (e)	
Columbia Contract Co.	Gravel	160 H.P. (e) 50 H.P. (s)	
Columbia Steel Co.	Steel	312 H.P. (e)	F
Continental Pipe Mfg. Co.	Pipe	300 H.P. (e)	D
Crown Mills	Flour	1000 H.P. (e)	F
Crystal Ice & Storage Co.	Ice Cream	300 H.P. (e) 75 H.P. (s)	D
Crystal Laundry Co.	Laundry	8 H.P. (e) 100 H.P. (s)	
Denny-Renton Clay & Coal Co.	Bricks	150 H.P. (s)	
Doernbecher Mfg. Co.	Furniture	350 H.P. (e)	F
East Side Box Co.	Boxes	545 H.P. (e)	
East Side Mill & Lumber Co.	Lumber	1500 H.P. (s)	E
Eastern & Western Lumber Co.	Sawmill	1200 H.P. (s)	F
Electric Steel Foundry	Steel	100 H.P. (e)	D
Emerson Hardwood Co.	Sawmill	300 H.P. (s)	C
Emerwood Panel & Top Co.	Wood	145 H.P. (e)	
Evening Telegram	Newspaper	172½ H.P. (e)	
Ferry Mill Co.	Sawmill	300 H.P. (s)	
Freeland Furniture Co.	Furniture	100 H.P. (e)	
Globe Grain & Milling Co.	Flour	400 H.P. (e)	
Golden Rod Milling Co.	Cereals	210 H.P. (e)	
Good Samaritan Hospital	Hospital	7 H.P. (e) 300 H.P. (s)	
Hazelwood Ice Cream Co.	Creamery	150 H.P. (e)	
Hesse-Martin Iron Works	Foundry	150 H.P. (e)	
Independent Cracker Co.	Crackers	250 H.P. (s)	
Independent Foundry Co.	Foundry	375 H.P. (e)	
Inman-Poulson Lumber Co.	Sawmill	2422½ (e) 2200H.P.(s)	F
Irving Dock	Grain Dk.	300 H.P. (e)	
Jones Lumber Co.	Lumber	650 H.P. (s)	
Jones Market	Meat	144 H.P. (e)	
Journal Publishing Co.	Newspaper	320 H.P. (e)	
LaGrande Creamery Co.	Ice	150 H.P. (e)	
Lang & Co.	Groceries	117 H.P. (e) 10 H.P. (w)	
Lipman-Wolfe & Co.	Store	113 H.P. (e) 250 H.P. (s)	
M. & N. Woodworking Co.	Planing	50 H.P. (e) 150 H.P. (s)	C
Marshall-Wells Co.	Saddlery	99 H.P. (e) 15 H.P. (w)	F
G. F. Matthews	Shipbuilder	300 H.P. (e) 400 H.P. (s)	
Meier & Frank Co.	Store	140 H.P. (e) 1000 H.P. (s)	
L. B. Menefee Lumber Co.	Sawmill	200 H.P. (e)	
Mersey Dock	Grain	100 H.P. (e)	
Millmade Cons. Co.	Carpenters	131 H.P. (e)	
Monarch Fire Clay Co.	Brick	100 H.P. (e)	
Monarch Lumber Co.	Sawmill	50 H.P. (e) 150 H.P. (s)	
Monarch Mills	Sawmill	200 H.P. (e) 2500 H.P. (s)	
Montgomery Ward & Co.	Cabinets	300 H.P. (e)	
Multonomah Hotel Co.	Laundry	450 H.P. (s)	
Multonomah Lumber & Box Co.	Boxes,Bskts.	1000 H.P. (s)	F
Murphy Timber Co.	Sawmill	60 H.P. (e) 250 H.P. (s)	
Mutual Creamery Co.	Creamery	174½ H.P. (e)	F
National Cold Storage & Ice Co.	Storage	200 H.P. (e)	F
National Tank & Pipe Co.	Tanks,Pipe	300 H.P. (s)	D
Nehalem Valley Lumber Co.	Sawmill	250 H.P. (s)	
Nicolai Door Mfg. Co.	Doors	550 H.P. (e)	C
Nicolai-Neppach Co.	Doors	19 H.P. (e) 160 H.P. (s)	D
North Bank Dock	Grain	105 H.P. (e)	
North Pacific Lumber Co.	Sawmill	364 H.P. (e) 2200 H.P. (s)	
North Portland Box Co.	Woodenware	510 H.P. (e) 1200 (s)	D
Northern Pacific Terminal Co.	Repairs	89 H.P. (e) 65 H.P. (s)	
Northwest Bridge & Iron Works	Iron	1757 H.P. (e)	C
Olds-Wortman-King	Dept. Store	400 H.P. (e) 300 H.P. (s)	
Olympic Cereal Mills	Cereals	1296½ H.P. (e)	
Oregon Box & Mfg. Co.	Boxes	185 H.P. (e) 1000 H.P. (s)	
Oregon Chair Co.	Wood	278 H.P. (e)	
Oregon Door Co.	Planing	170 H.P. (s)	C
Oregon Hotel	Refrigerating	148 H.P. (e)	
Oregon Ship Timber Mills	Sawmill	60 H.P. (e) 300 H.P. (s)	
Oregon-Washington R. R. & N. Co.	Repairs	1125 H.P. (e)	
Oregonian Publishing Co.	Newspaper	231½ H.P. (e)	
Overmire Construction Co.	Tanks, B'lrs.	200 H.P. (e) 70 H.P. (s)	
Portland Municipal Plants	Pumping	579½H.P. (e) 145 H.P. (w)	
Railroad Lumber Co.	Sawmill	115 H.P. (e)	
Rose City Flour Mills	Flour	165 H.P. (e)	C
Smith-Bowles Boiler Works	Boilers	200 H.P. (e)	
Smith & Watson Iron Works	Foundry	350 H.P. (e)	
Spaulding Building	Building	300 H.P. (s)	
Standard Factory No. 2	Clothing	150 H.P. (s)	
Stettler Mfg. Co.	Paper Prod.	100 H.P. (e)	C
Stradivara Phonograph Co.	Cases	166 H.P. (e)	C
St. Johns Lumber Co.	Sawmill	1700 H.P. (s)	
St. Vincent's Hospital	Building	500 H.P. (s)	
Swift & Co.	Packers	1520½ (e) 2045 H.P. (s)	F
Troy Laundry Co.	Laundry	200 H.P. (s)	
Tru-Blu Biscuit Co.	Food	150 H.P. (e)	F
Warren Cons. Co.	Shops	140 H.P. (e)	
Warren Packing Co.	Packers	150 H.P. (s)	D
Weinhard Plant	Brewing	1000 H.P. (s)	
West Coast Box & Lumber Co.	Boxes	170 H.P. (e)	
West Oregon Lumber Co.	Sawmill	1000 H.P. (s)	D
Western Cooperage Co.	Barrels	1800 H.P. (e)	F
Western Spar Co.	Lumber	100 H.P. (e)	
Western Struct. Stl. & Tank Co.	Elrs.,Tanks	306 H.P. (e)	
Willamette Iron & Steel Works	Foundry	1800 H.P. (e)	F
Yale Laundry	Laundry	125 H.P. (s)	
Prescott—Beaver Lumber Co.	Sawmill	1000 H.P. (s)	C
Prosper—Prosper Mill Co.	Sawmill	400 H.P. (s)	C
Rainier—Jacobsen & Reed Lumber Co.	Sawmill	350 H.P. (s)	
Menefee Lumber Co.	Sawmill	500 H.P. (s)	F
Reedsport—Johnson, C. Mc.	Sawmill	400 H.P. (s)	
Reedsport Lumber Co.	Sawmill	350 H.P. (s)	
Winchester Bay Lumber Co.	Sawmill	450 H.P. (s)	E
St. Helens—Columbia Contract Co.	RockCrusher	140 H.P. (s)	
Columbia County Lumber Co.	Planer	100 H.P. (e) 150 H.P. (s)	
Island Lumber Co.	Sawmill	600 H.P. (s)	C
St. Helens Lumber Co.	Sawmill	1000 H.P. (s)	
St. Helens Shipbuilding Co.	Wooden Ships	300 H.P. (s)	
Salem—Cherry City Milling Co.	Flour	140 H.P. (e)	
Drager Fruit Co.	Packers	16 H.P. (e) 100 H.P. (s)	F
Hunt Bros. Packing Co.	Cnd. Fruits	27½ H.P. (e) 160 H.P. (s)	F
Thomas Kay Woolen Mill Co.	Textiles	35 H.P. (e) 170 H.P. (s)	D
Kings Food Products Co.	Dried Fruits	109 H.P. (e)	D
Oregon Pulp & Paper Co.	Paper	1500 H.P. (e) 350 H.P. (w)	
Salem Tile & Mercantile	Brick	75 H.P. (e) 100 H.P. (s)	
Chas. K. Spaulding Logging Co.	Sawmill	238 H.P. (e) 750 H.P. (s)	F
Scappoose Lumber Co.	Planer	120 H.P. (s)	
Scio—Scio Logging & Lumber Co.	Planer	160 H.P. (s)	
Scofield—Standard Box & Lumber Co.	Sawmill	600 H.P. (e) 500 H.P. (s)	
Scotts Mills—Butte Creek Lumber Co.	Planer	140 H.P. (e)	
Seaside—Prouty Lumber & Box Co.	Boxes	560 H.P. (e) 5 H.P. (s)	
Sheridan—Ryan Allen Lumber Co.	Sawmill	180 H.P. (s)	
Sherwood—Washco Lumber Co.	Planer	300 H.P. (s)	
Siletz—Siletz Vay Lumber Co.	Shingles	84 H.P. (e) 100 H.P. (s)	
Silverton—Fischer Flour Mills, Inc.	Flour	150 H.P. (e) 150 H.P. (w)	E
Silver Falls Lumber Co.	Sawmill	1200 H.P. (s)	F
Silverton Lumber Co.	Sawmill	800 H.P. (s)	D
Sixes—Inman Mines Co.	Mines	770 H.P. (w)	
Springfield—Booth-Kelly Lumber Co.	Lumber	2400 H.P. (e) 1505 H.P. (s)	F
Springfield Mill & Grain Co.	Flour	100 H.P. (w)	
Stayton—Brown Petzel Lumber Co.	Lumber	102 H.P. (w)	
Sumpter—E. & E. Mines Co.	Mill	200 H.P. (e)	
Sumpter Gold Dredging Co.	Dredging	388 H.P. (e)	
The Dalles—Diamond Flour Mills Co.	Flour	237½ H.P. (e)	F
King's Food Products Co.	Dehydrating	133 H.P. (e)	D
Libby-McNeil & Libby	Cannery	60 H.P. (e) 250 H.P. (s)	
Seufert Bros. Co.	Cannery	175 H.P. (s)	
Wasco Warehouse Milling Co.	Flour	500 H.P. (e) 200 H.P. (s)	F
Tiernan—Tuft Lumber Co.	Lumber	300 H.P. (s)	
Tillamook—A. F. Coats Lumber Co.	Sawmill	1115 H.P. (e) 600 H.P. (s)	C
Timber—Prouty Timber Co.	Lumber	325 H.P. (s)	
Toledo—Chesley Lumber Co.	Planer	75 H.P. (e) 65 H.P. (s)	
Guy Roberts	Planer	100 H.P.	
Tualatin—Hall Lumber Co.	Lumber	150 H.P. (s)	
Turner—Oregon Grain Co.	Feed Mill	240 H.P. (w)	
Waldport—Earnest, W. E.	Planer	100 H.P. (s)	
Wallowa—Nabley Mimaugh Lumber Co.	Planer	600 H.P. (s)	E
Walton—Gibson & Pennington	Planer	125 H.P. (s)	
Stevens-Farris Lumber Co.	Planer	100 H.P. (s)	
Warrentown—F. C. Kelly Lumber Co	Sawmill	250 H.P. (s)	C
Warrenton Lumber Co.	Sawmill	450 H.P. (s)	
Wauna—Crossett Western Lumber Co.	Sawmill	3114 H.P. (e) 1300 H.P. (s)	E
Westimber—Eagle Lumber Co.	Sawmill	35 H.P. (e) 1200 H.P. (s)	C
Westlake—H. P. Dutton Lumber Co.	Sawmill	154 H.P. (s)	
Westport—Westport Lumber Co.	Sawmill	1000 H.P. (s)	C
Wheeler—Wheeler Lumber Co.	Sawmill	1100 H.P. (e) 600 H.P. (s)	F
Wheeler Box & Lumber Co.	Boxes	100 H.P. (s)	
Whitney—Ben Harrison Mines	Mill	344½ H.P. (e)	

UTAH

Alta—Cardiff Mining Co.	Mines	250 H.P. (e	
Emma Copper Mining Co.	Mines	250 H.P. (e)	
Bingham—Bingham Mines Co.	Mines	360 H.P. (e)	
Montana Bingham Mining Co.	Mines	160 H.P. (e)	
Ohio Copper Co.	Mines	3750 H.P. (e)	
Silver Shield Mining Co.	Mines	120 H.P. (e)	
Utah Apex	Mines	1835 H.P. (e)	
Utah Consol. Mining Co.	Mines	2180 H.P. (e)	
Utah Copper Mining Co.	Mines	60,000 H.P. (e)	
Utah Metal Mining Co.	Mines	1150 H.P. (e)	
Castle Gate—Cameron Coal Co.	Mines	636 H.P. (e)	
Coalville—Grass Creek Fuel Co.	Mines	125 H.P. (e)	
Weber Coal Co.	Mines	100 H.P. (e)	
Eureka—Apex Standard	Mines	100 H.P. (e)	
Big Hill Mining Co.	Mines	200 H.P. (e)	
Centennial Eureka Mining Co., Chief Con. Mining Co., Eagle and Bluebell	Mines	4000 H.P. (e)	
Copper Leaf Mining Co.	Mines	100 H.P. (e)	
Gemini Mining Co.	Mines	500 H.P. (e)	
Iron Blossom Mining Co.	Mines	500 H.P. (e)	
Iron King Mining Co.	Mines	200 H.P. (e)	
Knight Investment Co.	Mines	800 H.P. (e)	
North Beck Mining Co.	Mines	125 H.P. (e)	
Tintic Drain Tunnel	Mines	400 H.P. (e)	
Tintic Standard Mining Co.	Mining	1300 H.P. (e)	
Yankee Con. Mining Co.	Mines	225 H.P. (e)	
Heber—Woods Cross Canning Co.	Cannery	200 H.P. (e)	
Helper—Carbon Fuel Co.	Mines	600 H.P. (e)	
Liberty Fuel Co.	Mines	750 H.P. (e)	
Lyon Coal Co.	Mines	200 H.P. (e)	
Morton Coal Co.	Mines	225 H.P. (e)	
Mutual Coal Co.	Mines	125 H.P. (e)	
Peerless Coal Co.	Mines	175 H.P. (e)	
Spring Canyon Coal Co.	Mines	1500 H.P. (e)	
Standard Coal Co.	Mines	1200 H.P. (e)	
Hiawatha—U. S. Fuel Co.	Mines	2500 H.P. (e)	
Kenilworth—Independent Coal & Coke Co.	Mines	1518 H.P. (e)	
Park City—Daly Mining Co.	Mines	100 H.P. (e)	
Daly-West Mining & Milling Co.	Mines	1070 H.P. (e)	
Glenn Allen Mining Co.	Mines	100 H.P. (e)	
Judge Mining & Smelting Co.	Mines	5000 H.P. (e)	
New Quincy Mining Co.	Mines	100 H.P. (e)	
Ontario Silver Mining Co.	Mines	400 H.P. (e)	
Silver King Coalition	Mines	2013 H.P. (e)	
Silver King Con. Mining Co.	Mines	900 H.P. (e)	
Three Kings	Mines	120 H.P. (e)	

WASHINGTON

Anacortes—Morrison Mill Co.	Lumber	893 H.P. (e)	
Arlington—Canyon Milk Products Co.	Milk	Over 100 H.P. (e)	
Asotin—Farmers' Roller Mills	Grain	Over 100 H.P. (e)	
Burnett—Pacific Coast Coal Co.	Coal	1290 H.P. (e)	
Camp Lewis—Camp Lewis	Camp	Over 100 H.P. (e)	
Carbonado—Carbon Hill Coal Co.	Coal	1555 H.P. (e)	
Carlsborg—Carlsborg Mill & Timber Co.	Lumber	Over 100 H.P. (e)	C
Chewelah—Northwest Magnesite Co.	Mining	605 H.P. (e)	
Clarkston—Troy Lumber Co.	Lumber	Over 100 H.P. (e)	
Cle Elum—Independent Coal & Coke Co.	Coal	Over 100 H.P. (e)	
Miller & Dunn Lumber Co.		Over 100 H.P. (e)	
Cumberland—Cumberland Coal Mining Co.	Coal	290 H.P. (e)	
Ozark Coal Mining Co.	Coal	170 H.P. (e)	
Durham—Durham Coal Co.	Coal	225.5 H.P. (e)	
Eatonville—Town of Eatonville		Over 100 H.P. (e)	
Ohot Valley		Over 100 H.P. (e)	
Eatonville Lumber Co.	Lumber	Over 100 H.P. (e)	D

Enumclaw—White River Lumber Co. Lumber 100 H.P. (e) F
Everett—Weyerhauser Timber Co. Lumber 5000 H.P. (e) F
Grand Ridge—Central Coal Co. Coal 415 H.P. (e)
Hiawatha—Northwestern Improvement Co. Coal 145 H.P. (e)
Hoquiam—Hoquiam Cedar Lumber & Shingle Co. Lumber 1407 H.P. (e)
Lamb Machine Co. Lumber 402 H.P. (e)
Posey Mfg. Co. Lumber 400 H.P. (e) F
Issaquah—Pacific Coast Coal Co. Coal 825 H.P. (e)
Kennewick—Kennewick Flour Co. Milling 123 H.P. (e)
Pacific Fruit Exporting Co. 213 H.P. (e)
Kapowsin—Kapowsin Mill Co. Lumber Over 100 H.P. (e)
Longmire—Paradise Inn Over 100 H.P. (e)
Mineral—Carlton Lumber Co. Lumber Over 100 H.P. (e)
Mineral Lake—Mineral Lake Lumber Co. Lumber Over 100 H.P. (e)
Montesano—Shaeffer Bros. Mill Co. Milling Over 100 H.P. (e)
Shaeffer Bros. Shingle Co. Lumber Over 100 H.P. (e)
McKenna—McKenna Lumber Co. Lumber Over 100 H.P. (e)
Pasco—Attalia District Pumping 300 H.P. (e)
Burbank Company Pumping 900 H.P. (e)
Carstens Ranch Pumping 100 H.P. (e)
Franklin Company No. 1-600 No. 2-500 Pumping 1100 H.P. (e)
Highland Water Users Pumping 800 H.P. (e)
Pasco Flour Mills 300 H.P. (e)
White Bluff Water Users Pumping 100 H.P. (e)
Richland Irrigation District Pumping 108 H.P. (e)
Northern Pacific Ry. Co. 300 H.P. (e)
Pocahontas—Pocahontas Coal & Coke Co. Coal 250 H.P. (e)
Port Angeles—Angeles Mill Co. Milling Over 100 H.P. (e)
Crescent Boxboard Co. Boxboard Over 100 H.P. (e)
Olympic Cooperage Co. Barrels Over 100 H.P. (e)
Puget Sound Mill & Timber Co. Lumber Over 100 H.P. (e) F
Washington Pulp & Paper Co. Paper Over 100 H.P. (e) F
Port Gamble—Puget Mill Co. Milling Over 100 H.P. (e) F
Port Ludlow—Puget Mill Co. Milling Over 100 H.P. (e) F
Port Townsend—Miller & Teech Over 100 H.P. (e)
Puyallup—Evergreen Lumber Co. Lumber Over 100 H.P. (e)
Raymond—Case Shingle & Lumber Co. No. 2 Lumber Over 100 H.P. (e) C
Hanify Lumber Co. Lumber Over 100 H.P. (e) C
Hart & Wood Lumber Co. Lumber Over 100 H.P. (e) C
Pacific Fruit & Packing Co. Packers Over 100 H.P. (e) C
Raymond Shingle & Timber Co. Lumber Over 100 H.P. (e)
Raymond Veneer Co. Wood Over 100 H.P. (e) C
Quinalt Lumber Co. Lumber Over 100 H.P. (e)
Keystone Shingle Co. Lumber Over 100 H.P. (e)
Siler Mill Co. Lumber Over 100 H.P. (e) E
Willapa Lumber Co. Lumber Over 100 H.P. (e) F
Renton—Pacific Coast Coal Co. Coal 2254 H.P. (e)
Roslyn—Roslyn Cascade Coal Co. Coal Over 100 H.P. (e)
Roslyn Fuel Co. Coal Over 100 H.P. (e)
Ruston—Tacoma Smelter Co. Smelting Over 100 H.P. (e)
Seattle—Bemis Bros. Bag Co. Bags 200 H.P. (e) F
Kilbourne & Clark Wireless 760 H.P. (e)
Chas. H. Lilly Co. Milling 1300 H.P. (e)
Sumner K. Prescott Co. Tractors 200 H.P. (e)
Sears Roebuck & Co. 438 H.P. (e)
Seattle Chain & Mfg. Co. Chains 293 H.P. (e) C
Seattle Ice Cream Co. Ice Cream 104 H.P. (e) C
Snoqualmie—Western Coke & Collieries Co. Coal 175 H.P. (e)
South Bend—Columbia Box & Lumber Co. Lumber Over 100 H.P. (e) D
Getchel Shingle Co. Lumber Over 100 H.P. (e)
Miller Shingle Co. Lumber Over 100 H.P. (e)
E. K. Shingle Co. Lumber Over 100 H.P. (e)
Willapa Harbor Iron Works Lumber Over 100 H.P. (e)
Stanwood—Carnation Milk Products Co. Milk Over 100 H.P. (e)
Wisconsin Timber Co. Lumber Over 100 H.P. (e)
Steilacoom—Cascade Paper Co. Paper Over 100 H.P. (e)
Town of Steilacoon Over 100 H.P. (e)
Sumner—Fleishmann Yeast Co. Yeast Over 100 H.P. (e)
Sunnyside—Grainger Clay Products Co. Pottery 100 H.P. (e)
Mabton Alfalfa Meal Co. Meal 100 H.P. (e)
Tacoma—Albers Bros. Mill. Co. Milling Over 100 H.P. (e) F
Atlas Foundry Over 100 H.P. (e)
Balef Box Co. Lumber Over 100 H.P. (e)
Bilrowe Alloy Co. Metal Over 100 H.P. (e)
Builders Mfg. Supply Co. Mill Over 100 H.P. (e)
Busselin Lumber & Mfg. Co. Lumber Over 100 H.P. (e)
Carman Mfg. Co. Furniture Over 100 H.P. (e) F
Carstens Packing Co. Packers Over 100 H.P. (e) F
City Millwork Co. Lumber Over 100 H.P. (e)
Colby Star Iron Works Iron Works Over 100 H.P. (e)
Columbia Brewing Co. Brewing Over 100 H.P. (e) C
C. M. & St. Paul Ry. Co. Shops Over 100 H.P. (e)
Consumers' Central Heating Co. Heat Over 100 H.P. (e)
Danaher Mill, Water Front Milling Over 100 H.P. (e) D
Defiance Lumber Co. Lumber Over 100 H.P. (e) D
Dempsey Mill Co. Milling Over 100 H.P. (e) F
Dolge Lumber Co. Lumber Over 100 H.P. (e) C
Doud-McFarlane Machinery Co. Machinery Over 100 H.P. (e)
Fabere Bros. Over 100 H.P. (e)
Fir Lumber Co. Lumber Over 100 H.P. (e)
Griffin Wheel Co. Wheels Over 100 H.P. (e) F
Gregory Furniture Co. Furniture Over 100 H.P. (e) C
Glacier Fish Co. Cannery Over 100 H.P. (e)
Harmon Furniture Co. Furniture Over 100 H.P. (e) F
Harty Lumber Co. Lumber Over 100 H.P. (e)
Harty Lumber Co. Lumber Over 100 H.P. (e)
Hofius Steel & Equipment Co. Steel Over 100 H.P. (e)
Howell Hill Mill Co. Milling Over 100 H.P. (e)
Kenworthy Grain & Milling Co. Milling Over 100 H.P. (e) C
Keystone Lumber Co. Lumber Over 100 H.P. (e)
Lindstrom-Handforth Lumber Co. Lumber Over 100 H.P. (e) C
Matthaei Bread Co. Bakery Over 100 H.P. (e)
Modern Dairy Co. Dairy Over 100 H.P. (e)
Murphy Lumber Co. Lumber Over 100 H.P. (e)
Mutual Fir Column Co. Lumber Over 100 H.P. (e)
North End Lumber Co. Lumber Over 100 H.P. (e) C
Northern Board & Paper Co. Paper Over 100 H.P. (e)
Northern Pacific Railway Shops Over 100 H.P. (e)
Northwestern Woodenware Co. Woodenware Over 100 H.P. (e) D
Olympic Ice Co. Ice Over 100 H.P. (e)
Pacific Boiler & Welding Co. Welding Over 100 H.P. (e)
Pacific Box Co. Boxes Over 100 H.P. (e)
Pacific Brewing & Malting Co. Brewing Over 100 H.P. (e) F
Puget Sound Flouring Mill Milling Over 100 H.P. (e) E
Puget Sound Iron & Steel Co. Steel Over 100 H.P. (e) F
Puget Sound Mfg. Co. Over 100 H.P. (e)
Reliance Lumber Co. Lumber Over 100 H.P. (e)
Sound Tire Co. Tires Over 100 H.P. (e)
South Tacoma Mill Co. Milling Over 100 H.P. (e)
Sperry Flour Co. Milling Over 100 H.P. (e)
St. Paul & Tacoma Lumber Co. Lumber Over 100 H.P. (e) F
Tacoma Biscuit & Candy Co. Food Over 100 H.P. (e)
Tacoma Gas Co. Gas Over 100 H.P. (e)
Tacoma Grain Co. Grain Over 100 H.P. (e)
Tacoma Ice Co. Ice Over 100 H.P. (e) C
Tacoma Water Supply Co. Water Over 100 H.P. (e) C
T. & G. Lumber Co. Lumber Over 100 H.P. (e)
Tennent Steel Casting Co. Casting Over 100 H.P. (e)
Tetterman Mill Co. Milling Over 100 H.P. (e)
Tidewater Cross Arm Co. Crossarms Over 100 H.P. (e)
Todd Shipyards Ships Over 100 H.P. (e) E
U. S. Machinery Co. Machinery Over 100 H.P. (e)
Vermont Marble Co. Marble Over 100 H.P. (e) F
Walker Whetstone Co. Whetstones Over 100 H.P. (e)
Washington Mfg. Co. Lumber Over 100 H.P. (e) C
Washington Parlor Furniture Co. Furniture Over 100 H.P. (e) C
Water Way Mill Co. Milling Over 100 H.P. (e)
Western Boat Building Co. Boats Over 100 H.P. (e)
Wheeler-Osgood Co. Lumber Over 100 H.P. (e) F
Toppenish—H. P. Preston 100 H.P. (e)
Buena Box & Lumber Co. Lumber 112 H.P. (e)
Utah, Idaho Sugar Co. Sugar 155 H.P. (e)
Yakima Fruit Growers' Association Fruit 396 H.P. (e)
Union Mills—Union Lumber Co. Lumber Over 100 H.P. (e) C
Walla Walla—Eureka Mills Lumber 223 H.P. (e)
Freewater Box Co. Lumber 152 H.P. (e)
Preston-Shafer Co. 240 H.P. (e)
Walla Walla Meat Co. Meat 212 H.P. (e) C
Walla Walla Penitentiary Prison 800 H.P. (e)
Walla Walla Valley Ry. Co. Shops 1073 H.P. (e)
White House Co. Lumber 135 H.P. (e) C
Washougal—Crown-Willamette Pulp & Paper Co. Paper Over 100 H.P. (e)
Washougal Woolen Mills Textiles Over 100 H.P. (e) D
Yakima—County Crusher Gravel 160 H.P. (e)
Horticultural Union Fruit 188 H.P. (e)
Jones Bros. Vinegar 107 H.P. (e)
Libby, McNeil & Libby Cannery 100 H.P. (e) F
Miller Bldg. 110 H.P. (e)
Murphy Theater Theater 104 H.P. (e)
Nashes Fruit & Storage Co. Fruit 101 H.P. (e)
J. N. Perry 167 H.P. (e)
Paris Heights Irrigation District No. 2 Water 109 H.P. (e)
Selah Fruit Storage Co. Fruit 139 H.P. (e)
Utah, Idaho Sugar Co. Sugar 182 H.P. (e)
Yakima Valley Transportation Co. 960 H.P. (e)
Yakima Orchards Fruit 150 H.P. (e)

WYOMING

Dines—Colony Coal Co. Coal 2500 H.P. (e)
Green River—J. E. Irvine Gravel 120 H.P. (e)
Gunn—Gunn-Quesaly Coal Co. Coal 1000 H.P. (e)
Lionkol—Lion Coal Co. Coal 1350 H.P. (e)
Rock Springs—Central Coal & Coke Co. Coal 1350 H.P. (e)
Megeath Coal Co. Coal 1000 H.P. (e)
Reliance Mines 2500 H.P. (e)
Rock Springs Mines 4000 H.P. (e)
Superior Mines 4500 H.P. (e)
Winton Mines 3000 H.P. (e)
Superior—Premier Coal Co. Coal 800 H.P. (e)
Rock Springs Fuel Co. Coal 400 H.P. (e)
Superior-Rock Springs Coal Co. Coal 800 H.P. (e)

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